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Modern Iron and Steel Works in China

Comprehensive Survey of the Plants and Their Sources of
Raw Materials—Combination of Machinery with
Primitive Transport and Handling

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BEFORE describing the latest addition to the blast furnace plants in China it will add interest to divide the pig iron producing districts into their respective groups. These include the blast furnaces in the Hankow district, in Manchuria, in Korea, because of its connection with the mainland, and the newly created Peking district, containing the new blast furnace of the Lungyen Mining Administration. The location of these blast furnaces, as well as the important lines of railroad and water transport, are shown on the accompanying map.

Hankow District

Hankow is 585 miles inland from Shanghai on the Yangtse River and is accessible at all seasons to sea-going or coastal steamers. Communication with the port of Shanghai is obtained either entirely by steamship or by steamship to Nanking and thence by Shanghai-Nanking Railroad. Nanking is 215 miles from Shanghai by water and 193 miles by rail. There is also a direct rail connection north to Peking, 754 miles distant by the Peking Hankow Railroad. Wuchang, on the opposite side of the Yangtse River, is the terminal of the Canton-Hankow Railroad. When this line is

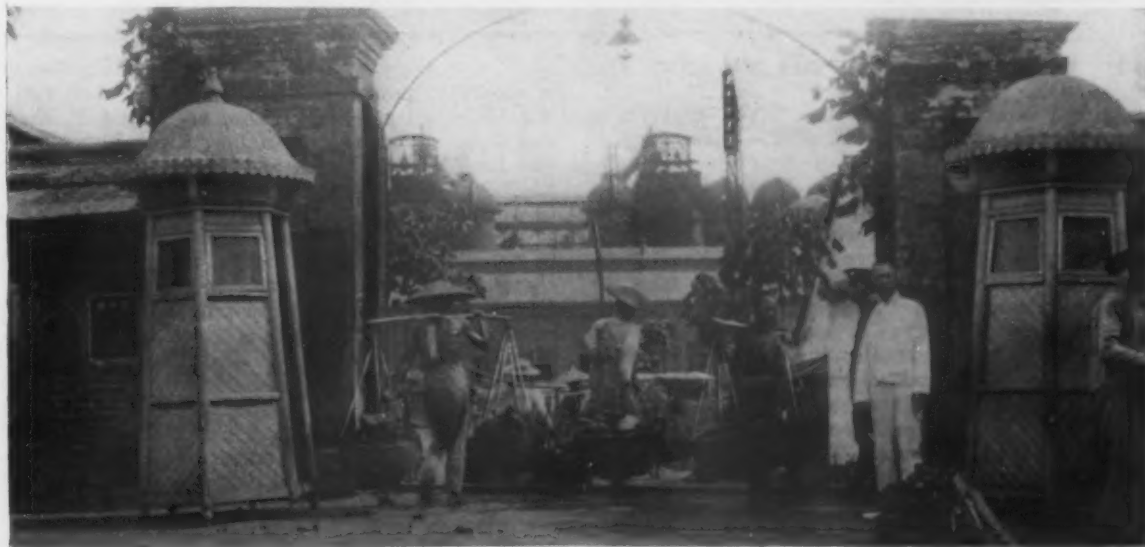
finished to Canton, there will be a direct rail connection between Wuchang and Canton and Kowloon, on the mainland opposite Hongkong. The distance to Kowloon will be 831 miles. In this district are located the Hanyang iron and steel works and the Tayeh iron and steel works of the Hanyehping Co. and the Yangtse Engineering Works.

Hanyang Iron and Steel Works

These works are located at Hanyang in Hupeh Province, at the junction of the Han and Yangtse rivers, with Hankow on one side of the Yangtse and Wuchang on the opposite side. Here, in addition to the only steel furnaces and rolling mills in China, are two blast furnaces of German design, each with a capacity of 250 tons of pig iron per day. There are also two 100-ton blast furnaces that are obsolete and have not been in use for some years.

The 250-ton furnaces have eight Cowper hot blast stoves and vertical stock hoists, for handling hand charging barrows to the charging platform. The furnace top arrangement is of the Langen type, with a bell shaped charging hopper, an inner bell which seats on the lower flange of the charging hopper, a gas seal which seats on the top flange and a central bleeder pipe. The furnace gases pass through the center of the inner

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Entrance to the Hanyang Works, near Hankow, China, Showing Primitive Means of Delivering Coke into the Plant. The coolies carry it in baskets from small sail boats which have brought it down the Yangtse River

bell and the bleeder pipe to a vertical downcomer, which connects with a series of three dust-catchers.

Blowing equipment consists of two Parsons compound, condensing turbo-blowers. Steam is generated in Lancashire and Babcock & Wilcox boilers using coal and blast furnace gas as fuel.

The handling of raw materials, supplies, labor and finished products to and from the works is by boat, as there is no direct rail or bridge connection with either Hankow or Wuchang. Coke is shipped from the Pinghsiang collieries in small sailboats and is handled into the works in baskets, with coolie labor. Iron ore and limestone, shipped from Tayeh in barges, is unloaded by grab buckets suspended from a cantilever crane. Because of the great variation in the level of the Yangtse River, it is possible, at times, to unload with the barges close to the wharf; again they must be unloaded from a point as much as 130 ft. out, which

the Hanyehping Co. and the Hupeh Government. The Government finally opened this mine in 1919 and began marketing the ore. Loading equipment and shops were built, as well as an independent railroad to the Yangtse River.

All of these iron ore deposits yield a high grade hematite with a ratio of ore to stripping of about 50 per cent. It is reported that they contain about 35,000,000 tons of ore. An average analysis of the ore will approximate the following percentages:

Fe	62	Al ₂ O ₃	1.00
SiO ₂	6.5	Ca	0.20
S	0.38	CaO	0.40
P	0.068	Moisture	2.90
MnO	0.42		

Coal and coke are obtained from the Pinghsiang collieries and coke ovens, at Anyuan in Kiangsi Province,

Ore for the Tayeh Works Is Obtained from the Tayeh Deposits, 19 Miles Away. It is an open pit working very rich in ore (Below)



Ore from the Working Face Is Carried in Baskets to the Mine Cars for Transfer to the Railroad (Above)

requires the use of a special crane with extra long cantilevers.

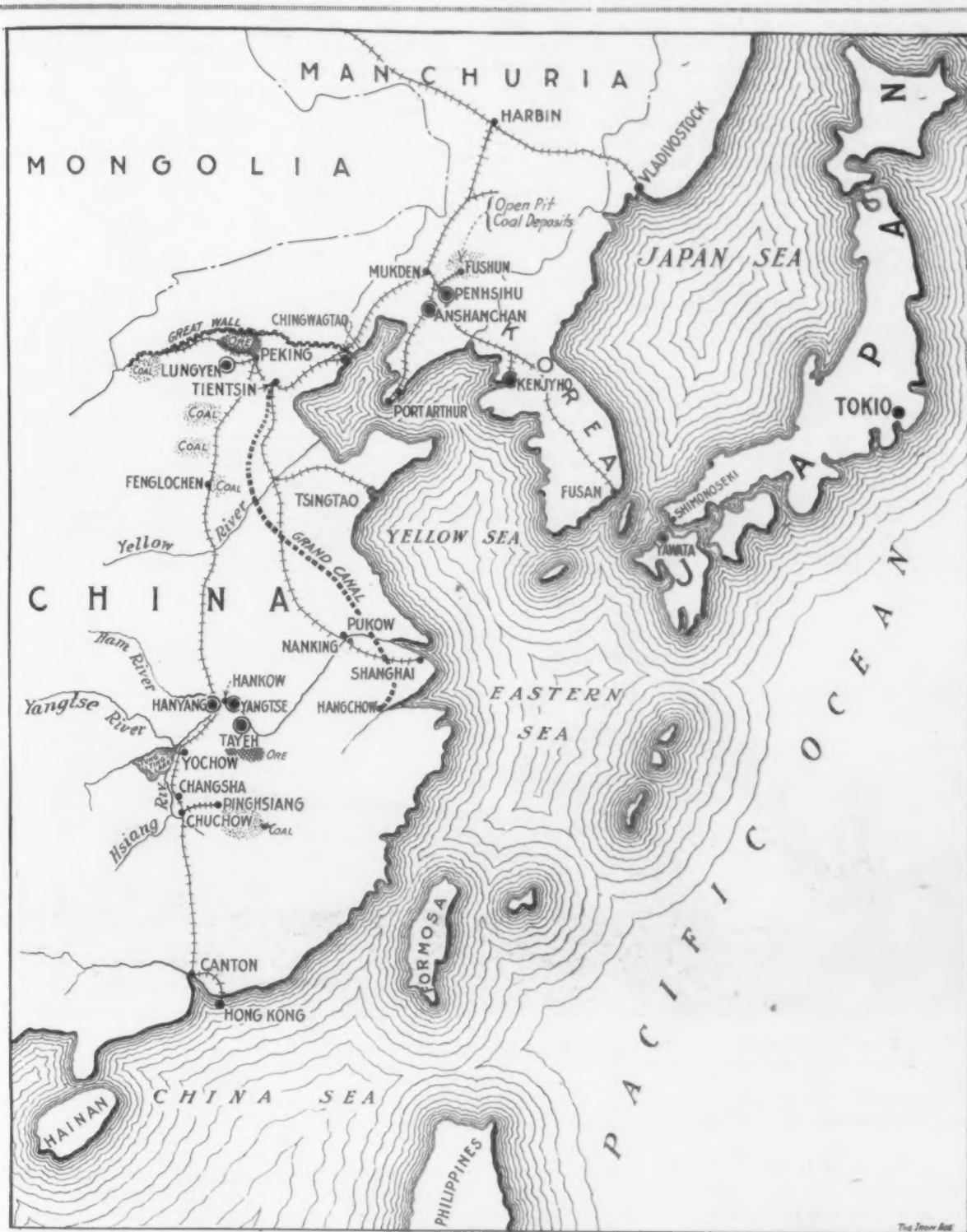
Iron ore is obtained from the Tayeh deposits in Hupeh Province, southeast of Hankow. These deposits include several mines known as Tiehtaowan, Tiehman-kan, Shamantze and Tsinshan. From the present knowledge of these deposits the ore is confined to the tops of a range of hills, from which it is blasted, loaded into cars by hand and pushed to a double inclined plane. There are a number of such inclines which take the ore cars to a common level, leading to a crushing and sizing unit, and thence to a stocking trestle. The trestle is built over a tunnel so that ore can be drawn through gates into standard gage hopper cars. The ore cars are hauled a distance of 18 miles to the Yangtse River and an additional mile to the newly constructed Tayeh furnaces. This railroad is owned by the Hanyehping Co. The ore is unloaded by hand to a storage pile along the river and to barges for towing to the Hanyang works, or into steamships for delivery to Japan. The water haul to the Hanyang works is about 90 miles.

Adjacent to these ore deposits is the Ksiangpishan deposit, or generally known as Elephant Nose Mountain, whose ownership has long been disputed between

south of Hankow. The distance to the Hanyang works is about 315 miles. The normal means of transportation is by railroad to Chuchow, a distance of 60 miles, and thence by boat on the Hsiang River, Tungting Lake and the Yangtse River. In stages of low water an additional 32-mile rail haul is made from Chuchow to Changsha. With the completion of the Canton-Hankow railroad, between Changsha and Wuchang, there will be an all-rail connection between the mines and Wuchang, but it is doubtful whether, with the cost of rail transportation, the company will be able to compete with the combination rail and water route, with no direct connection between Wuchang and the works. The all-rail distance to Wuchang will be 378 miles.

The Pinghsiang mines are on the northern edge of the coal deposits which underlie a large part of the southwestern portion of Kiangsi and Hunan Provinces. The coal outcrop appears along the Ping River and extends in an easterly direction to Linkiang. The mines comprise an area of 5.2 square miles and were estimated by German engineers, before the war, to contain 500,000,000 tons of coal. There are two sections of these mines, the "adit," in which the coal is reached by tunnels, and the "shaft," which contains the shafts.

The coal is semi-anthracite, and is suitable for



The Seven Blast Furnace Plants in China Located

THREE plants centered around Hankow, in the South, draw their ore, coal and limestone from neighboring sources. Two plants in Southern Manchuria and one in Korea obtain their raw materials from those regions. The new Lungyen plant, near Peking, levies on ore and coal not far away, and other sources are being opened up.

Altogether, these seven plants contain fourteen blast furnaces, ranging from 100 to 400 tons capacity per day, but the two 100-ton furnaces at

Hanyang are obsolete and may never again be operated. The active furnaces are as follows:

Hanyang	.....two of 250 tons
Yangtse	.....one of 100 tons
Tayeh	.....two of 400 tons
Penhsihu	.....two of 150 tons
Anshanchan	.....two of 200 tons
Kenjyho	.....two of 100 tons
Lungyen	.....one of 250 tons

Total daily capacity.....2,550 tons

At 90 per cent of full operation, this would mean 840,000 tons per year.

coking. The coal measures incline from 15 to 20 deg., and the thickness varies from 8 in. to 35 ft., with many faults. Mining is confined to a seam which averages 16 ft. thick. The coal carries little sulphur and phosphorus, but the ash will vary from 20 to 35 per cent.

For coking, both native and foreign ovens are used. There are two batteries of German designed rectangular ovens aggregating 256 ovens, one on each side of a coal washery. No by-products are recovered. The average coke analysis by percentages follows:

Moisture	5 to 10	Ash	11.50 to 15.45
Volatile matter.....	1	Sulphur	0.50
Fixed carbon.....	82.50 to 62.99	Phosphorus	0.06

Tayeh Iron and Steel Works

This plant is located on the Yangtse River, in Hupeh Province, and 90 miles southeast of Hankow. It contains two modern blast furnaces, each with a rated capacity of 400 tons of pig iron per day. Construction work was started at the beginning of the

in the usual location and twelve auxiliary tuyeres directly below the mantle ring. There is also an auxiliary iron notch. The furnace bosh is cooled with bronze cooling plates.

The top platform is carried on a square 4-column steel structure extending from the ground level. There is a bridge connection between the two furnaces so that, in case of failure of one of the hoists, the charging hopper can be carried up the other skipway and transferred across this bridge. The furnaces have Kneeland tops and Otis electrically operated skip hoists. There is a single concrete steel trestle built over a tunnel, with gates through which the materials are charged into the Kneeland charging buckets.

Each furnace has three 22-ft. diameter by 100-ft. high 3-pass, hot blast stoves. The gas travels from the top of the furnace through a pair of downcomers, two dust catchers, a pair of tower washers, a pair of scrubbers and finally to the stoves and boilers.

The power house contains three Fraser-Chalmers blowers with Worthington surface condenser, two



Seven Miles East of Hankow, on the Yangtse River, Lies the 100-Ton Furnace of the Yangtse Engineering Works. The hoist house and counterweight tower appear at left of the skip hoist, with cast house in right foreground. There are four hot blast stoves

war and the plant has only recently been completed.

The furnace site was originally at average high water level and has been filled an average of 11 ft., which is the highest known river level. The plant level is 59 ft. above the low water level, which indicates a possible variation of 48 ft. between the low and high levels. All of the filling material was obtained from surrounding hills, some of which had to be removed to make room for the plant and the town.

The two blast furnaces are located 131 ft. apart, with cast houses and slag granulating pit in the intervening space. The principal dimensions are: hearth, 15 ft. 6 in. diameter by 9 ft. 10 in. deep; bosh, 22 ft. diameter by 13 ft. 1½ in. high, and height of shaft, 90 ft. There is a straight 6-ft. section of shaft at the mantel, which tapers to the throat at ¾ in. per foot. The brickwork in the hearth wall is 45 in. thick, while in the bosh wall it is 27 in. thick.

The hearth jacket is of steel plate, surrounded on the inside by a ring of cast iron cooling plates which are lipped over the steel jacket. The tuyere jacket is of cast metal, and the bosh is supported with a series of bands. The steel plate shell and mantle ring are carried on six cast iron columns. There are twelve tuyeres

Fraser-Chalmers Rateau turbines connected to Vickers 1500-kw., 5000-volt generator, switchboard, etc. There are five 1000-hp. units of Babcock & Wilcox watertube boilers arranged to burn gas or coal and connected to a single concrete stack.

Water supply will be furnished by pumps located in a pump house with wheels to permit its being raised and lowered on the sloping river bank, to suit the varying levels of the Yangtse River. The water supply line is laid up the bank and contains several fittings with angle branches for connecting the pumps. The pipe line delivers water into a gravity water tunnel which leads to a settling, spraying and storage reservoir, from which it is pumped to a steel water tower.

The metal will be cast into 60-ton Pollock iron ladles and transported to a covered pig casting building, where it is poured into chilled pig beds. This building is served by a 10-ton crane and at each end there is an extension of the runway for storing pig iron.

The steel work for the blast furnace proper, consisting of hearth jacket, furnace shell, platforms, skip bridges, top and bottom rings for the stoves and the dome and cone bottoms for the dust catchers were furnished by Riter-Conley Co., Pittsburgh. The balance



Casting Side of the Furnaces at the Tayeh Works. Each furnace has a capacity of 400 tons per day, the plant being modern in every respect and completed since the war ended —

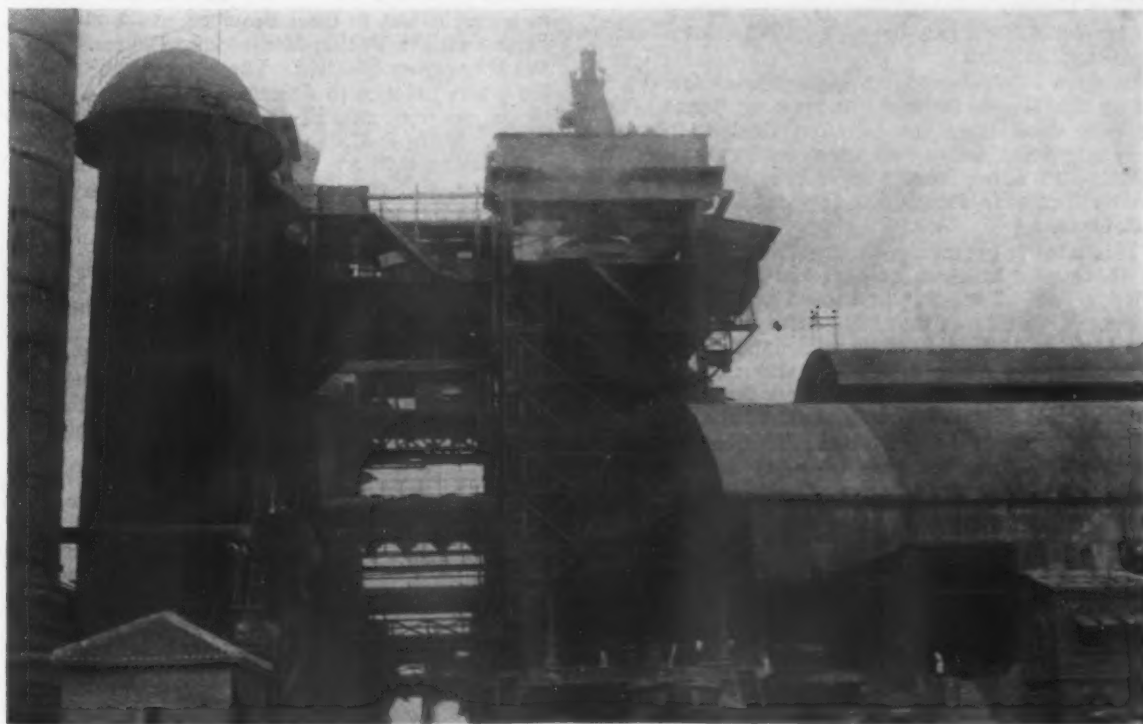
of the plate work was fabricated by the Yangtse Engineering Works from plate rolled at the Hanyang works. The castings were furnished jointly by the Yangtse engineering works and the shops at the Pinghsiang collieries.

Outside the works gate is a hospital and a building containing the police and fire departments and the town. The houses for the staff are two-story dwellings. They are built single, double and in blocks of varying design. There is a club house containing reception, reading, billiard and dining rooms and sleeping rooms for guests. The quarters for laborers are built in blocks. The town

plot is well laid out and has all of the western modern improvements, including streets, lighting, sewage, water supply and fire protection.

Iron ore is obtained from the Tayeh deposits, which supply the Hanyang works also. The railroad haul is about 19 miles. Limestone is obtained from adjacent hills.

Coal and washed coal for coking are delivered by boat from the Pinghsiang collieries. The additional water haul of 90 miles makes the total distance from the mines 405 miles. The coal is unloaded by bucket and delivered over an overhead cableway to a large concrete



At Hanyang Are Two 250-Ton Furnaces of German Design, as Well as Two Obsolete Furnaces of 100 Tons Which Have not Been Operated for Some Years

storage pocket, located directly back of the boiler house. This pocket contains a series of hoppers which are elevated so as to discharge the coal into cars for shipment to beehive ovens, located back of the blast furnace. Coke is carried to the furnace skips in buckets ready for hoisting and charging.

Yangtse Engineering Works

This concern operates foundry, machine and structural shops near Hankow. During the war it was found difficult to obtain a source of pig iron at a reasonable price, so a 100-ton capacity blast furnace was built to insure a supply of iron. The plant is located on the Yangtse River about 7 miles east of Hankow and, like the Hanyang works, has no direct connection with a railroad. This furnace enterprise was based upon purchasing raw materials in the open market.

The furnace is of modern construction and has steel plate hearth and bosh jackets and shell, supported on six cast iron columns. The furnace top is of the double bell type. It is filled with a single skip bucket which travels on an inclined skipway. The dimensions of the furnace are: hearth, 8 ft. 5 in. diameter by 6 ft. 3 in. high; bosh, 13 ft. 3 in. diameter by 10 ft. 5 in. high; throat, 7 ft. 9 in. diameter, and shaft, 65 ft. high. There are four hot blast stoves, 14 ft. diameter by 70 ft. high. The designs for the furnace were furnished by Perin & Marshall, engineers, New York.

Material Fabricated in the Works

All of the materials were made in the Yangtse shops with the exception of the steel plate, bricks, boiler tubes and engines. The company built four watertube boilers, which are arranged to burn blast furnace gas and coal. Because of the war it was impossible to secure suitable blowing engines and three old rolling mill engines were shipped from the United States and England. Allis-Chalmers Co. furnished drawings for the air ends and a few sample air valves. From these three blowing engines were built. One of the engines was connected through sheaves and rope drive to an electric generator and is arranged so that when used for this purpose the air end can be disconnected. The air ends connect with an underground air duct and a pair of vertical tubular water coolers for cooling the air and removing its moisture.

There are no mechanical means for handling and stocking the ore, coke and limestone, nor are there any arrangements for filling the skip bucket other than the usual hand buggies.

Iron ore is obtained from a number of sources, including the Hupeh Government mine at Tayeh. Coal and coke come from the Luhokou Coal & Coke Co., whose mines and native coke ovens are located in Honan Province, 13 miles from Fenglochen, on the Peking-Hankow Railroad. Fenglochen is about 448 miles north of Hankow.

This mine is operated with a single shaft extending 230 ft. to a 12-ft. seam of coal which contains about 0.35 per cent of sulphur and 0.045 per cent of phosphorus. Here coke is made in native ovens which are from 12 ft. to 18 ft. diameter and about 8 ft. deep, with walls projecting about 2 ft. above the ground. In the center is a fire hole leading to an air flue which leads to the outside surroundings and around the top of the projecting wall are draft holes. The coal fines are spread in the ovens and tamped in layers and the top covered with a coating of clay. The ovens are lighted at the bottom fire hole and the coking turnover is done in an 18-day cycle, with a recovery of one ton of coke from 1.8 tons of coal. The coke will average about 20 per cent ash. Coal and coke for the new furnace of the Lungyen mining administration will also be shipped from the Luhokou mines.

Manchurian District

In this district are located the furnaces of the Penhsihu Coal & Iron Co. and the Anshan Steel Works. Penhsihu is a joint Japanese and Chinese enterprise under the management of Okura & Co., while Anshan

is one of the many industrial developments of the South Manchurian Railroad.

Penhsihu Coal & Iron Co.

This plant consists of two blast furnaces, each with a rated capacity of 150 tons of pig iron per day. The furnaces are at Penhsihu, about 45 miles southeast of Mukden, on the main line of the South Manchurian Railroad. One furnace was completed in 1914 and the second in 1918. The company operates a briquetting plant in connection with the blast furnace and a concentrating plant at Nanfen.

Manchuria contains large deposits of minerals, particularly magnetic iron ore, having an iron content averaging 35 per cent coal, etc., which lie around Penhsihu as a center. The ore for this furnace plant comes from Miaoerkow, 24 miles distant, and coal comes from mines at Penhsihu. Coking is done in beehive ovens.

This furnace plant and minerals were fully described in the Feb. 7, 1918, issue of THE IRON AGE, page 386.

Anshan Steel Works

This plant is located at Anshan, on a branch line of the South Manchurian Railroad which extends from Mukden to Port Arthur. There are two 200-ton capacity blast furnaces built in 1919 and 1920 and four batteries of Koppers by-product coke ovens.

Iron ore comes from mines at Anshan and coal from Fushun, about 22 miles southeast of Mukden. The Fushun coal mines are reported to contain 1,200,000,000 tons of bituminous coal, with seams varying in thickness from 78 ft. to 480 ft. Mining is carried on in open pit mines, with steam shovels, as well as in slope mines.

Korean District

At Kenjyho, on a branch line connecting with the South Manchurian Railroad at Hrijyo, is the Kenjyho Works. This plant, under the management of the Mitsubishi Co., contains two blast furnaces, each of 100 tons capacity per day, and a battery of 50 Wilputte by-product coke ovens.

Peking District

In 1918 the Lungyen Mining Administration was formed to develop minerals and build a blast furnace, with the Chinese Government holding a half interest in the company. A site for the furnace was selected at Shiechinshan, in Chili Province, about 11 miles from Peking on the Peking-Mentowkow Railroad and about 100 miles from Tientsin. The blast furnace represents the latest practice in American design, and is intended to be the first unit of the first steel plant in North China. Perin & Marshall are the consulting engineers.

Iron ore, oolitic in form and averaging about 50 per cent iron, will come from recently discovered iron deposits at Hsuanhwa, in Chili Province. The ore will be transported south, a distance of 110 miles, to the furnace over the Peking-Suiyuan railroad to Peking, and thence to the plant over the Peking-Mentowkow. Coal and coke will be secured from the Luhokou Coal & Coke Co.'s mines in Honan Province, and will be shipped from Fenglochen, north over the Peking-Hankow railroad, a distance of 306 miles. Limestone will come from newly opened mines 8 miles from the plant and will be shipped over the Peking-Mentowkow railroad.

There exist large undeveloped deposits of coal at Tatung, in Shensi Province, along the Peking-Suiyuan railroad, and which may be a source of future coal supply for this plant. By the use of Tatung coal, the delivery will be confined to a single railroad and the haul reduced from 306 miles to 230 miles.

(To be continued)

A cast steel frog, made of titanium treated steel, has been put on the market by L. A. Green, 1113 First National Bank Building, Pittsburgh. It is marketed under the name "Durabil Frog." Several advantages are claimed for its use.

X-Ray Examination of Irregular Metals*

New Method, Using Methyl Iodide as an Absorber,
Described as Rapid, Inexpensive and Applicable
Commercially

BY DR. ANCEL ST. JOHN

HITHERTO X-ray examination has been restricted to objects of nearly uniform thickness and regular outline; the inspection of such articles as those shown in Fig. 1 has been inconvenient and unsatisfactory. This group is made up of 5/16-in. hexagonal-head machine bolts, a piece of iron pipe, a brass lens-holder from an optical bench, a 3/8-in. hexagonal head machine bolt, two 1/4-in. rough sections of 1-in. bar stock, a brass thumbscrew, a piece of 1/4 by

magnitude. If the absorptive power of the surrounding medium is less than that of the specimen, its transparency will be greater and more X-rays will pass through it than through the specimen, which will thus appear as a darker area, as shown in Fig. 3. But if the absorbing power of the medium is greater than that of the specimen, less X-rays will pass through it than through the specimen, which will then appear as a lighter area, as in Fig. 4. Here the absorber used for

Fig. 3 has been replaced by a more opaque medium with a transparency less than iron or cobalt but greater than brass. In general, it is preferable to have the medium less absorbent than the specimen, as the time required for a satisfactory exposure increases rapidly with the absorption. There are cases where the more absorbent medium is useful; for instance, it is thus possible to distinguish indentations on the surface from cavities in the interior; the former, being filled with absorber, would be darker, while the latter, being empty, would be lighter.

Liquids as Absorbers

Before investigating the suitability of various materials as absorbers for use with tool metals a series of bars of tool stock was examined and a few containing interesting defects were selected as test specimens. Many absorbents

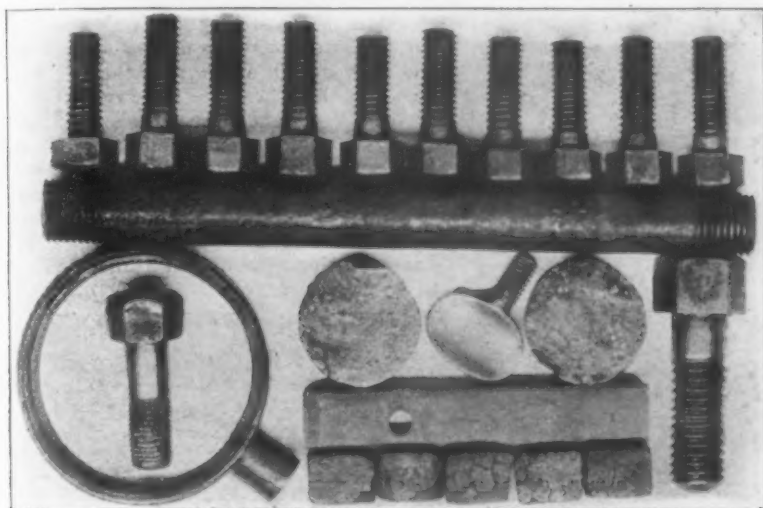


Fig. 1.—Group of Irregular Objects to Be Radiographed

1/2-in. brass bar, five pieces of cobalt, and half of a 1/2-in. cold-headed machine bolt which has been cut in two length-wise.

The transparency to X-rays of all parts of the region exposed at one time must be of the same order of magnitude, otherwise the portions of the fluorescent screen or photographic negative corresponding to the most transparent parts will be materially over-illuminated when the illumination for the least transparent parts is correct; essential details will consequently be obscured. This is shown in Fig. 2, which is a radiograph of the group of objects of Fig. 1 exposed so as to bring out the defect in the head of the 1/2-in. bolt and some cracks in the cobalt.

To overcome this difficulty, the author has developed a method of mounting specimens that makes possible the examination of such objects. Fig. 3 is a radiograph of the same group of objects by the new technique, exposed so as to bring out the defects referred to. Not only are the outlines of the objects clearly defined but many structural details, not apparent in Fig. 2, are easily discerned. The method is simple, rapid, and inexpensive and can readily be used on a commercial scale.

In this method, the specimens are surrounded with a medium of slightly different transparency to X-rays in a container with opaque walls and parallel transparency of the entire field is made of the same order of

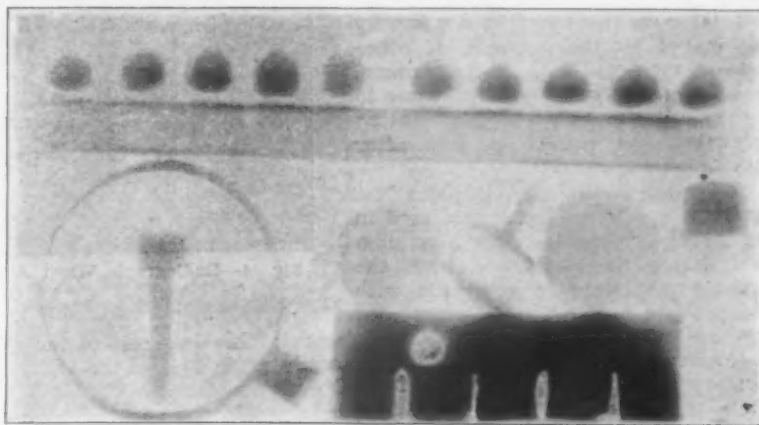


Fig. 2.—Radiograph When Transparency to X-Ray of All Parts Is Not of Same Order of Magnitude

were then studied. Granular substances give much the same appearance as spongy structures in the specimen and are useless. Fine powders are better but it is next to impossible to pack them uniformly when dry; when mixed with water, oil or grease to form a paste, they tend to occlude air, forming cavities indistinguishable from blowholes in the specimen. The best substance is a liquid.

The choice of liquids is restricted to compounds of high density, containing a constituent of high atomic weight so that the X-ray absorption may be high. Convenience demands that the liquid should not react appreciably with the materials to be examined, should mix in all proportions with a common liquid, and should be non-volatile. Of the numerous liquids tested, methylene iodide, CH_2I_2 , has proved most satisfactory.

*Abstract of a paper to be presented at the Canadian meeting of the American Institute of Mining and Metallurgical Engineers in Montreal, Aug. 30. The author is with the Research Laboratories of the Union Carbide & Carbon Co., Long Island City, N. Y.

Its density is 3.34 gm. per cu. cm.; its principal constituent, iodine, has a very high X-ray absorption, so that it can be used with alloys containing 25 per cent of tungsten; it mixes in all proportions with benzine, so that dilutions suitable for use with less absorbent alloys can be made; it is less volatile than water; and it reacts but slightly with most metals. Its objectionable features are a characteristic and persistent odor, a tendency to react with aluminum, and a rather high price. The actual cost in service, however, can be kept low by rinsing specimens and containers in ben-

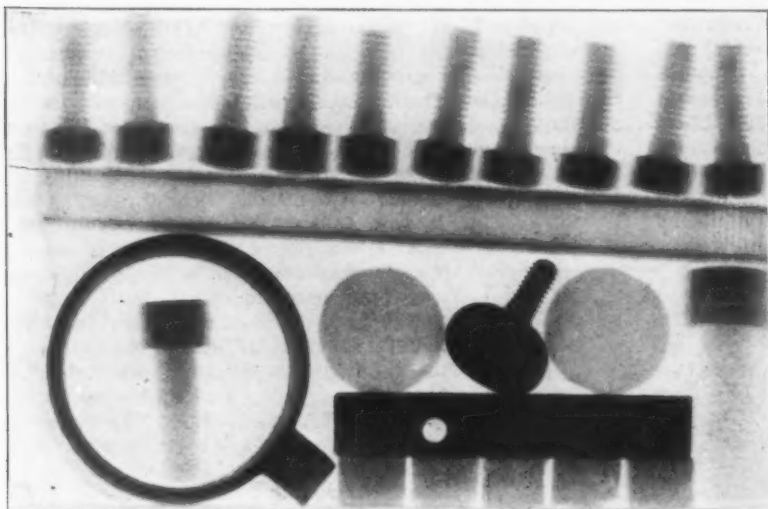


Fig. 3.—Radiograph Made by Author's Method

zine after exposure, saving the rinsings, and using them to replace benzine lost by evaporation from the dilute solutions. In this way one lot has been used day after day for nearly six months with a wastage of about 10 per cent. The reaction with aluminum is a decomposition accompanied by the evolution of heat and the liberation of iodine vapor. It occurs suddenly after the metal and liquid have been in contact for some time and is apparently encouraged by the presence of other metals in contact with the aluminum, by heating, and possibly by exposure to X-rays. It can be avoided by rinsing specimens and vessels at once after making an exposure.

When the methylene iodide was first used, the specimens were immersed in the liquid contained in an aluminum pan. After an experience with the reaction mentioned, a container with lead walls and celluloid faces fastened together with celluloid cement was devised; this is shown in Fig. 5. These containers are easily made to suit any thickness of material and can be adapted for use with the faces horizontal, vertical, or at an intermediate angle, say 45 deg.

Smallest Cavities Which Can Be Found

To gain some idea of the size of the smallest cavity that could be detected with certainty, a penetration meter was made; this consists of a set of aluminum strips 0.008 in. thick fastened together with the ends offset to form a series of shallow steps. In Fig. 6, *A* shows the penetration meter on a bar 1 in. wide and 3/16 in. thick, containing no tungsten; *B* a 7/32-in. round rod of the same stock; *C* a 7/32-in. round rod containing 6 per cent tungsten; *D* a 1/4-in. square bar containing 3 per cent tungsten; *E* a 5/16-in. square bar containing 16 per cent tungsten; and *F* a 5/16-in. round rod containing 5 per cent tungsten, all immersed in 1/2 in. of a 70-per cent solution of methylene iodide in benzine. A single step of the meter makes a distinct difference in the density of the radiograph; and as differences of the same character are observable in *B* it is evident that cavities only 0.008 in. thick can

be detected. The outlines of bar *D* are distinguished with difficulty on account of the great similarity in transparency of this bar and the medium; this suggests the possibility of supporting small objects in frames of sheet metal, say copper, and diluting the liquid until its absorption is the same as that of the frames. These would then not be visible in a radiograph.

This figure also exhibits the three types of cavities observed during the investigation. The spots in *E*, the rounded portion of the large spot near the right-hand end of *D*, and the rounded part of the principal spot in *C* are blowholes. The jagged spots in *D*, the transverse spots in *F*, and the distinctly transverse spots in *B* are shrinkage cavities. The cloudy area near the left-hand end of *F*, the thread-like patches in *C*, and the faint patches in *B* are spongy structures like that in Fig. 6. None of these specimens had slag inclusions. Distorted remnants of these are, however, observable in Figs. 3 and 4. The straight filaments through the heads and even through the entire length of several of the 5/16-in. bolts are due to slag that has been drawn out during the rolling. The fact that these are not further distorted in the bolt heads shows that these bolts were cut from hexagonal bars and not cold-headed. In the latter case, they would have been spread out transversely, like the flaw in the fragment of the 1/2-in. bolt, which is known to have been cold-headed. The

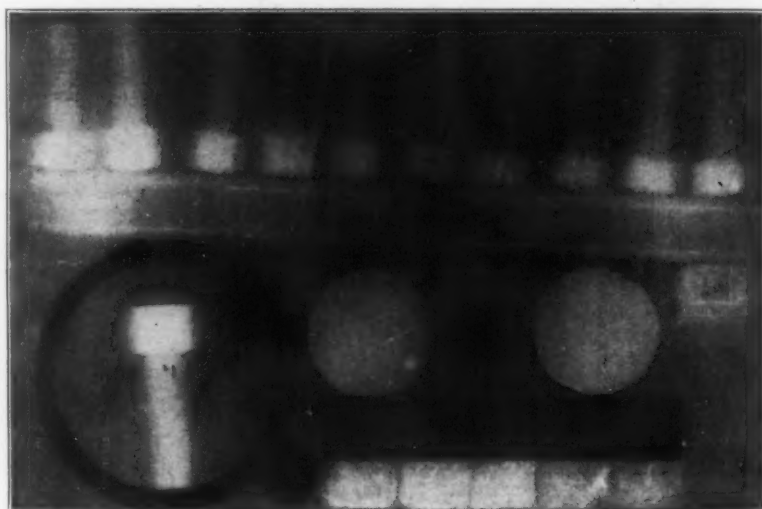


Fig. 4.—Radiograph When Absorbing Power of Medium Is Greater Than That of Specimen

rest of the slag filament is probably in the other half of the bolt.

Variety of Objects Examined

To show the variety of objects examined in this way, a few examples have been selected at random. Fig. 7 shows a set of races for ball bearings; Fig. 8 shows 98 forged balls for use with such bearings, 90 of which have no detectable flaw, the remaining 8 being faulty. Fig. 9 shows two plug gages of tool metal containing considerable tungsten cast upon steel cores; one of these has no detectable flaw, the other has marked defects within 0.02 in. of the surface. These radiographs were all made on the rough forgings before any machine work was done. The faulty balls and the defective plug gage were, of course, rejected. Without inspection, the defect in the gage would have been encountered after considerable expensive machining had been done, that is, in the course of manufacture. The flaws in the balls would probably have escaped attention until they failed in service.

These two examples illustrate two cases in which routine X-ray inspection may be justified. In the first, it is a question of dollars and cents. If the manufac-

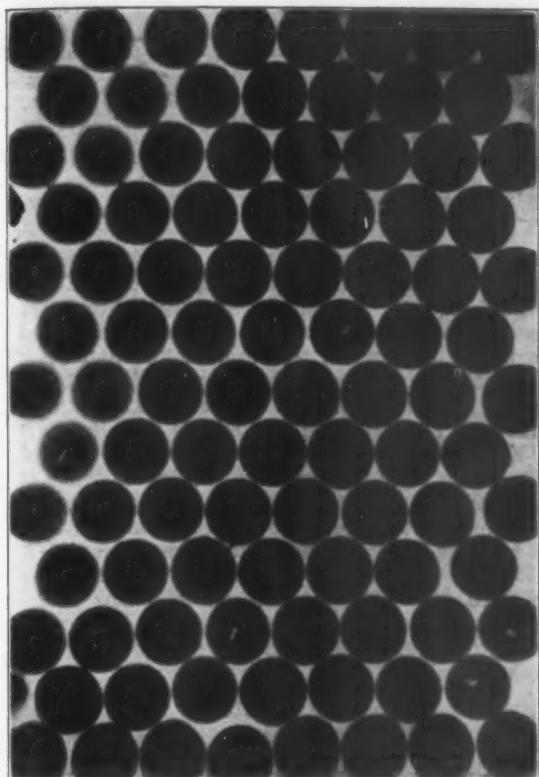


Fig. 8.—Radiograph of Forged Balls for Use in Bearings

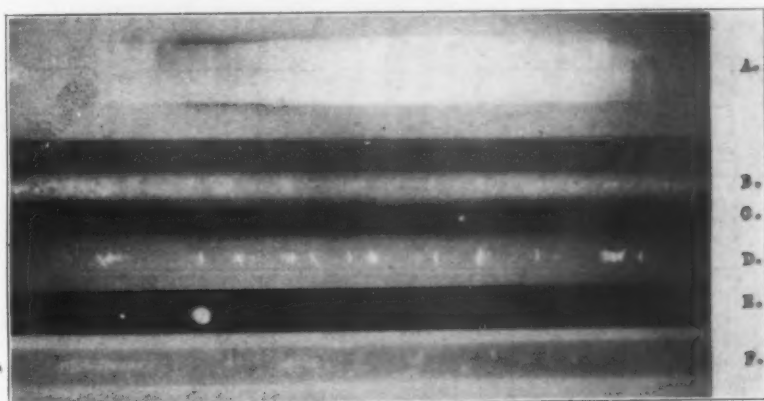


Fig. 6—Illustrating the Use of a Penetration Meter

turing procedure cannot be developed so as to eliminate obnoxious defects, and if the cost of machining before the eventual rejection is large compared with the cost of X-ray examination, inspection before machining would be profitable. In the second case it may be a question of reputation, or even a question of human safety; in the latter case the cost should not figure. As a matter of fact, routine inspection should not be very expensive.

Value of the New Method

The value of radiographic examination in the development of new products and new processes cannot be too greatly stressed. A single radiograph gives more information as to the character and extent of cavities and inclusions than a great number, one is tempted to say than any number, of sectionings and does so without damaging the specimen. It is thus possible to submit a specimen containing known defects to various mechanical tests and to correlate the results to the internal structure disclosed by the radiograph, or to section it at the places most favorable for direct examination of the defects. This use of X-rays has been discussed by Lester.*

For a long time the use of X-ray examination in the metallurgical industry has been limited by the comparatively thin specimens that could be penetrated

*"X-Ray Examination of Steel Castings," *Chem. & Met. Eng.* (1923) 28, 261-267.

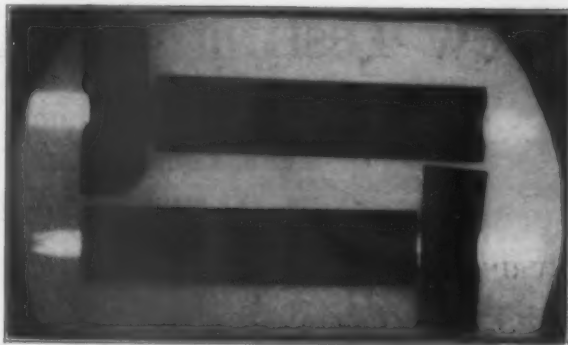


Fig. 9.—Plug Gages

successfully and by the difficulties encountered in mounting specimens of varying thickness or irregular shape. But Lester shows that steel 3 in. thick can be radiographed in $\frac{1}{2}$ hr. with apparatus now on the market. When the demand justifies the expense, the makers of tubes and generating plants will undoubtedly develop apparatus extending this limit considerably. The present paper has shown that good radiographs of objects of any external form can be secured with the new procedure and that the procedure itself is simple. The limitations hitherto imposed by shape have thus been removed. It is therefore permissible

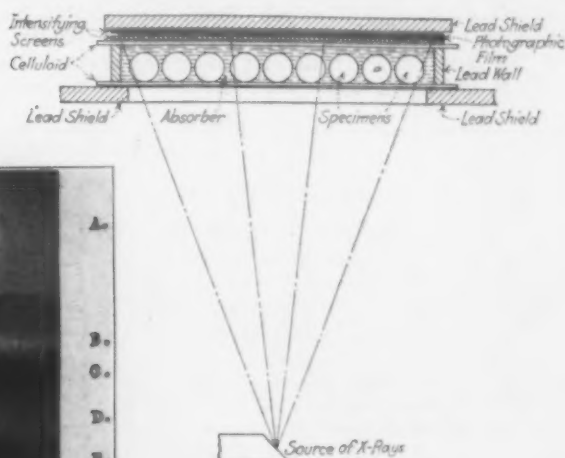


Fig. 5—Arrangement of Apparatus for Radiographing Objects of Varying Thickness

to say that any object that can be penetrated sufficiently by the X-rays can now be radiographed successfully.

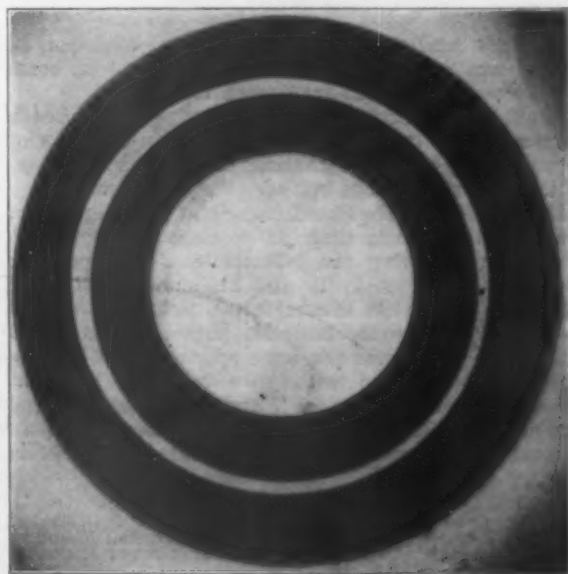


Fig. 7—Ball-Bearing Race

New Testing Methods for Castings—II*

Discussion of Elastic Limit, Modulus of Elasticity, Sound Tests, Compression Tests and the Bar Test— Comparisons With Brinell Hardness

DURING the war, Mr. Portevin had occasion to test a good many defective shells made of semi-steel. His opinion on the value of artillery methods was given previously. In consequence, he tried to find better and speedier methods for determining the value of castings. Although his observations refer only to semi-steel, they can be used also in foundries, because many defective shells were no better than ordinary castings with a low percentage of phosphorus. His methods should, however, be verified as regards higher phosphorus castings, before any definite conclusions can be drawn therefrom.

Having stated that test bars give an indication of the value of shells, Mr. Portevin made experiments to find the relation between those results produced by the bar under ordinary conditions and those tension and compression tests which were taken with all the possible care for giving precision as great as possible. The compression test was considered important, not only because castings are often used under compression, but because one of the most important points for shells is that the base should resist an enormous compression strain at the moment the shell is fired. The majority

It should be understood that the limit of proportionality employed by Mr. Portevin, instead of the elastic limit, figures on this table only in the case where a straight line can be more or less distinguished at the origin of the curves. It can be noted that, when it was possible to indicate a limit of proportionality, it is generally less than one-third of the breaking strain.

Modulus of Elasticity.—These curves permit determining Young's modulus for inclination on the axis of the loads of the rectilinear part of the curve (when it exists), or the tangent at the origin of this curve in the other cases. It can at once be seen that, contrary to what happens for steel, the modulus varies considerably. It runs from 4000 to 11,500 kg. per sq. mm. (5,700,000 to 16,350,000 lb. per sq. in.) and varies about proportionately to the breaking load Rt , as can be seen in the figures. This can be expressed by the empirical formula:

$$Mt = 325 Rt + 1,150.$$

The strongest castings are those which have the highest modulus. They are therefore less deformable and a good deal more influenced by the parasitical

TABLE I

Reference to Diagram	CHEMICAL ANALYSIS						TENSION TEST (1)			COMPRESSION TEST (2)				STATIC BEND TEST (4)		
	C Total Carbon	C _g Graphitic Carbon	Si	Mn	P	S	Load at Rupture Rt	Limit of Proportionality E_{pt}	Modulus of Elasticity Mt	Load at Rupture Rc	Limit of Apparent Elasticity E_{ac}	Diameter of Swelling a	Diameter Swelling e	Hardness Test (3) Δ	Load at Rupture Rf	Deflection at Rupture f
	%	%	%	%	%	%	Kg/mm ²	Kg/mm ²	Kg/mm ²	Kg/mm ²	Kg/mm ²	%		No.	Kg	mm
Fig. 9, 3.82	3.25	1.50	0.75	0.13	0.14		7.1		2,900	36.6	22	0	0.17	105		
Curve A, Fig. 11, 3.65	2.95	1.46	0.77	0.11	0.15		13.4	(3)	6,600	62.1	27	15.9	0.27	131	675	0.28
Curve B, Fig. 11, 3.67	2.98	1.48	0.64	0.10	0.16		14.7		6,300	64.1	30	17.5	0.27	143	725	0.35
Curve CN2, Fig. 10, 3.48	2.86	1.47	0.64	0.09	0.12		14.8		6,100	65.5	32	18.7	0.34	149	740	0.32
220 Shell swelled, Fig. 12, 3.71	3.30	1.30	0.78	0.16	0.19		15.7	7	7,100	61.1	32.5	24.4	0.44	143		
Curve CN1, Fig. 10, 3.50	2.87	1.44	0.70	0.06	0.12		17.4		7,900	66.7	37	17.2	0.30	149	750	0.38
220 shell swelled, Fig. 13, 3.23	2.70	1.13	0.62	0.09	0.19		20.0	4.4	9,000	77.7	39	24.4	0.41	163		
Curve C, Fig. 11, 2.97	2.65	1.27	0.65	0.07	0.22		21.4	(6)	9,300	100	50	28.1	0.50	187	925	0.30
Test bar, Fig. 14, 3.44	2.73	1.24	0.76	0.16	0.14		26.7	7.4	11,500	103	50	23.8	0.35	207		

- (1) On a test bar 16 mm. (5/8 in.) in diameter and 150 to 200 mm. (6 to 8 in.) in length for the part calibrated.
(2) On a cylinder 16 mm. high and 16 mm. in diameter.
(3) Bar of 10 mm. (0.4 in.) load 3,000 kg. (6,600 lb.), hardness test for 15 seconds.
(4) On a test bar of 10 x 10 x 65 mm. (0.4 x 0.4 x 2.56 in.), distance between supports: 30 mm. (1.2 in.), knife edge width: 2 mm. (0.08 in.)

of defective shells that were tested had exploded on a firing test which was systematically made on some shells taken at random from each lot.

Realizing the importance of the ever-present bends on the results of tension tests, Mr. Portevin took special precautions to avoid all chances of error, by employing the long and tedious but sure method of mirrors.

Elastic Limit.—He found it difficult to determine a value for the elastic limit of castings. The curves obtained in observing the deformations corresponding to the strains, Figs. 9, 10 and 11, show no straight path. The properties of the metal, therefore, can be determined only by the complete curve. Figs. 12, 13 and 14 give the curves for some specimens. The nine castings experimented with gave breaking loads at tensions that varied between 7 and 27 kg. per sq. mm. (10,000 and 38,400 lb. per sq. in.). Table I sums up the total of the chemical and mechanical characteristics of these castings.

*Paper presented by E. Ronceray, to the Institute of British Foundrymen, in the name of the Technical Foundrymen's Association. Translated by E. J. Lowry, Hickman, Williams & Co., Pittsburgh. The first section appeared in our issue of Aug. 16, page 393.

bends. This is another reason for forbidding the ordinary bending tests for castings.

Sound Tests.—The sound test was tried during the war by a special commission, as a means to investigate shells. It was found that:

(a) for steel shells the sonority test gives a useful indication, on the basis of the duration of the sound;

(b) in semi-steel shells the volume of the sound gives an idea of the quality of the metal; for a like model of shells, the duller the sound, the poorer the metal.

Consequently the sound test was retained, to give an idea of the quality of the metal in semi-steel shells and not for steel shells. The above conclusions relative to the modulus of elasticity explain the reason. It is known that the volume of the sound resulting from striking a solid depends on the speed of propagation of the sound in this solid. This speed increases as the square root of the modulus of elasticity. Now, for ordinary carbon steel the modulus is about the same, and the thermal treatments effect variations of only about 10 per cent, while for semi-steel they vary from 1 to 3, that is to say, 100 per cent either side of

the average value. It is easy to find out from the sound which are the best shells in a lot. This remark may be of considerable interest in practice.

Compression Tests.—Castings in current practice are, as much as possible, employed at all times under compression. The start of the "shot" compresses the rear part of the shells so that the deformation by swelling, at this moment, can become extremely serious.

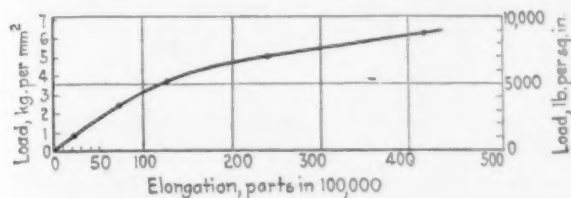


Fig. 9—Diagram of Tension Test of Test Bar Coming from a Semi-Steel Shell of 155 mm. (6 1/8 in.) Diameter. Rupture occurred at 7.1 kg. per sq. mm. (10,100 lb. per sq. in.)

In fact, this is the only important deformation to consider when ascertaining the analysis of a metal for firing. Consequently, it seems important to determine the properties of the metal at compression. The compression tests call only for simple and short test bars. Hence, we have another reason for doing away with

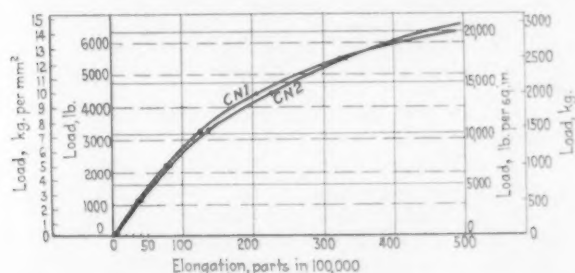


Fig. 10—Diagram of Tension Tests of Two Test Bars Coming from a Semi-Steel Shell of 220 mm. (8.66 in.) Diameter. Rupture of CN1 occurred at under 5480 kg. (12,080 lb.), representing 17.4 kg. per sq. mm. (24,750 lb. per sq. in.); of CN2 at 14.8 kg. per sq. mm. (21,050 lb. per sq. in.)

the tension test and using the compression test in its place.

Mr. Portevin has made experiments on cylinders of 16 mm. diameter and 16 mm. height (1 x 1 in.) and has recorded the diagram by means of a testing machine. The breaking strain and the elastic limit were

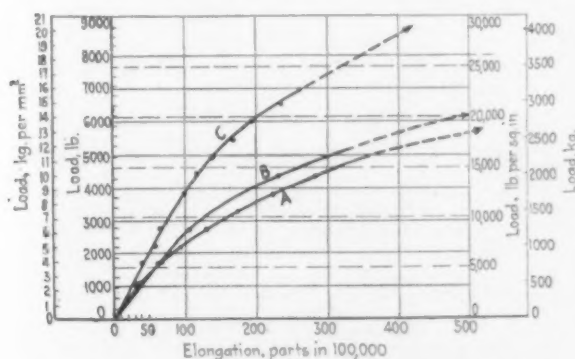


Fig. 11—Diagram of Tension Tests of Three Test Bars. Rupture of A occurred at under 2700 kg. (5950 lb.), representing 13.4 kg. per sq. mm. (19,050 lb. per sq. in.); of B at under 2950 kg. (6500 lb.), representing 14.7 kg. per sq. mm. (20,900 lb. per sq. in.); of C at under 4300 kg. (9480 lb.), representing 21.4 kg. per sq. mm. (30,430 lb. per sq. in.)

observed. Moreover there were measured on the test bars, after the test, the contraction and the expansion. Owing to the small length of the samples it has not seemed desirable to try to obtain the modulus of elasticity at compression. On the contrary, one of the advantages of the bending test is to give a chance to

the investigator to calculate the coefficient of elasticity.

For the castings experimented with (see Table I), the loading strain at tension Rt is about one-fourth to one-fifth of the breaking strain at compression. The approximate empirical formula giving comparative results can be expressed thus:

$$Rc = 2.5 Rt + 18.$$

From a much more extended series of determinations (about 100) results the elastic limit at compression, Eac , which can be expressed by the following empirical formula for the test bars of 16 mm. in length:

$$Eac = 0.2 Rc + 20.$$

Limits and Elastic Moduli at Tension and at Compression

It would be absurd to compare the elastic limits at tension and at compression of Table I, as the experimental conditions were not sufficiently precise, and also because the definition is too conventional. The dimensions of the test bars for tension and compression are very different, and Mr. Portevin has thought it desirable

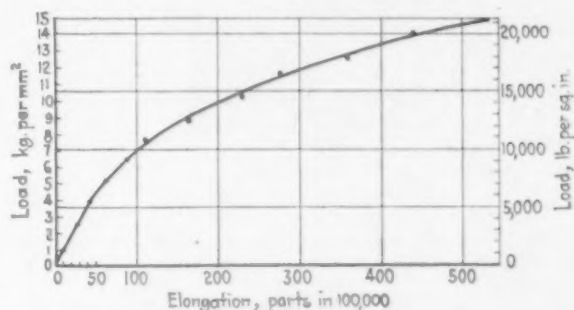


Fig. 12—Diagram of Tension Test of Bar Taken from Semi-Steel Shell of 155 mm. (6 1/8 in.) Diameter, Swelled at the Base on Firing. Rupture occurred at 15.7 kg. per sq. mm. (22,650 lb. per sq. in.); the elastic limit was reached at 8.96 kg. per sq. mm. (12,650 lb. per sq. in.); modulus of elasticity, 7100 kg. per sq. mm. (10,100,000 lb. per sq. in.)

to make new tests to obtain precise data relative to the firing test on shells. Test bars of the same dimensions were chosen (Fig. 15). The same precise testing methods were employed.

To avoid all trace of imperfect results on the compression test bars, it was necessary to use short test bars. The length is twice the diameter, for the test of

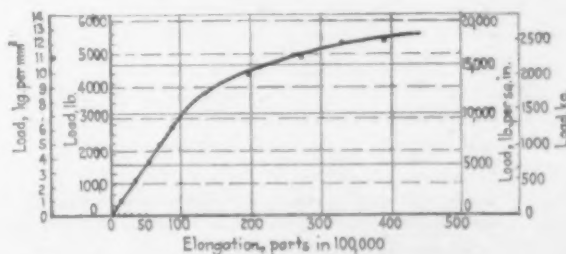


Fig. 13—Diagram of Tension Test of Test Bar Taken from a Semi-Steel Shell of 293 mm. (11.6 in.) Diameter. Rupture occurred at 20 kg. per sq. mm. (28,450 lb. per sq. in.); the elastic limit was reached at 4.4 kg. per sq. mm. (6,250 lb. per sq. in.); modulus of elasticity, 9100 kg. per sq. mm. (12,940,000 lb. per sq. in.)

both tension and compression bars. The mirror method was employed. The distance between knives was from 50 to 55 mm. (2 to 2 1/8 in.). Three tension test bars and three compression test bars were taken out in bars of 60 mm. (2 3/8 in.) diameter, that had been run successively with the same ladle of semi-steel.

The enlargement of the longitudinal deformations was about 700 fold, while the diameter of the test bars was made to the hundredth of a millimeter (1/2540 in.). The variations in length were observed on two opposite points of generation and noted every 500 kg. (1102 lb.), which arrangement led to an approximate speed

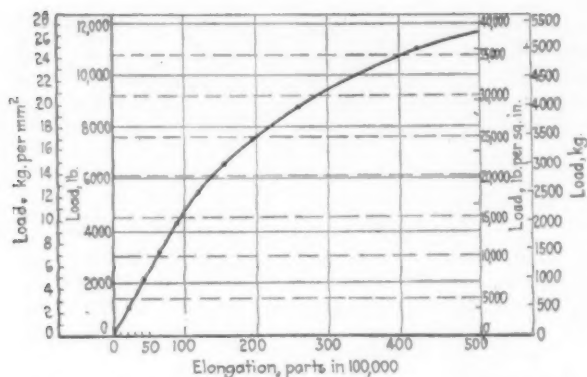


Fig. 14—Tension Test of a Test Bar from a Semi-Steel Shell

of 1200 kg. (2645 lb.) per minute. At the start the observation of the deformations under weak loads permitted the interposing of lead bushings in the mount-

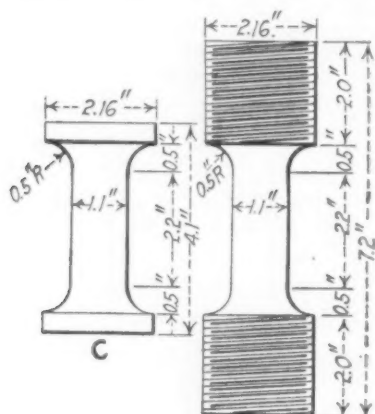


Fig. 15—Test Bars for Compression (C) and Tension (T) Tests. The cylindrical bodies at 28 mm. (1.1 in.) should be exactly calibrated. The base of the compression bar is squared off and accurately faced. Keep the center holes in the ends of the tension bar, these ends being threaded with a pitch of 5 mm. (about 5 threads per in.)

ings, so as to reduce the lateral strain to a minimum. The elongations and shortenings were determined at about 1/50,000 of the length of the measure.

The metal tested was of a quality of average

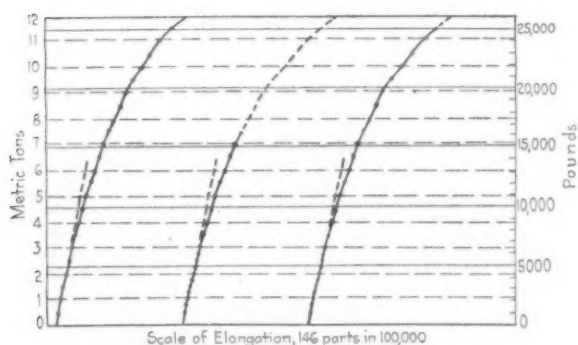


Fig. 16—Tension Tests of Semi-Steel Bars with Sections of 616 sq. mm. (0.955 sq. in.) Giving the Following Results (See Also Table II):

	TB1	TB2	TB3
Load at limit of proportionality			
in kg.....	2,000	2,500	2,250
in pounds.....	4,400	5,500	4,950
Limit of proportionality in kg. per sq. mm.....	3.2	4.1	3.6
in lb. per sq. in.....	4,550	5,830	5,120
Elongation per cent at the limit of proportionality.....	0.026	0.033	0.029
Modulus of elasticity at tension in kg. per sq. mm.....	12,700	12,250	12,650
in thousands of lb. per sq. in.	18,060	17,420	17,990

strength under tension, about $R_t = 25$ kg. per sq. mm. (35,500 lb. per sq. in.). The results of the experiments are shown in Table II, and the diagrams Figs. 16 and

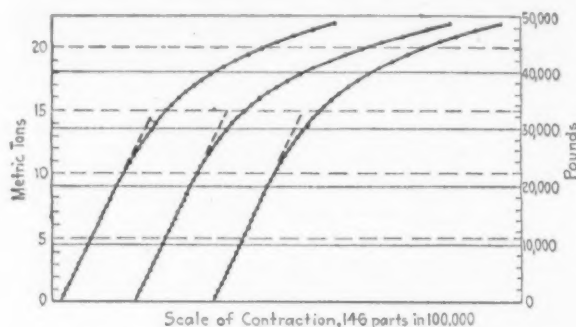


Fig. 17—Compression Tests of Semi-Steel Bars with Sections of 616 sq. mm. (0.955 sq. in.) Giving the Following Results (See Also Table II):

	CB1	CB2	CB3
Load at limit of proportionality			
in kg.....	8,000	7,500	6,500
in pounds.....	17,630	16,530	14,330
Limit of proportionality in kg. per sq. mm.....	13.0	12.2	10.6
in lb. per sq. in.....	18,500	17,350	13,070
Contraction per cent at the limit of proportionality.....	0.115	0.104	0.086
Modulus of elasticity at compression in kg. per sq. mm.....	11,300	11,800	12,300
in thousands of lb. per sq. in.....	16,070	16,780	17,490

17. It may be said that the limit of proportionality to tension is:

$$E_{pt} = 3.5 \text{ kg. per mm.}^2 = 4975 \text{ lb. per sq. in.}$$

Limit of proportionality to compression:

$$E_{pc} = 12 \text{ kg. per mm.}^2 = 17,040 \text{ lb. per sq. in.}$$

The following remarks can be made:

(a) The strengths under tension and at compres-

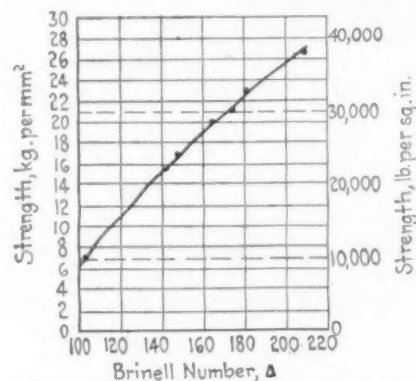


Fig. 18—Relation Between Brinell Hardness Number (Δ) of Semi-Steel and Its Strength in Tension

sion are about in the relation given by the empirical formula:

$$R_c = 2.5 R_t + 18.$$

(b) The above formula gave for the values of R_t

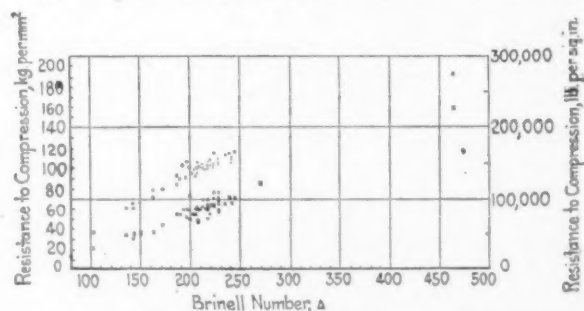


Fig. 19—Relation Between Brinell Hardness Number (Δ) of Semi-Steel and Its Strength in Compression. The dots in the upper band of plotted results represent R_c ($= \frac{1}{2}$), load at rupture under compression. The crosses in the lower band represent E_c or Q_4 ($\Delta=50$), the limit of apparent elasticity under compression

and R_c , which are found on an apparent elastic limit, $E_{ac} = 50$ kg. per mm.² (71,000 lb. per sq. in.), while the experiments have given only 32 kg. per mm.² (45,500 lb. per sq. in.). The reason is that the test bars were five times longer and also that the precision was greater. It can be seen by the form of curves that this can make a great difference.

(c) The rule often given, that the elastic limit at compression is equal to three times its elastic limit at tension, is absolutely fantastic. The relation between these two characteristics can vary from 1 to 4, following the conventional definition adopted and the precision of the measurements. This is because of the fact that the length of the test bars employed for the tension test and the compression test is very different. Consequently, a comparison will do no good.

(d) In the same way as for steel, the moduli of elasticity at tension and at compression are practically equal, the mean value being approximately 12×10^5 kg. per mm.² (17,040,000 lb. per sq. in.).

There is a considerable discrepancy between the values found by the limit of proportionality $E_{pc} = 12$ kg. per mm.² (17,040 lb. per sq. in.) and the apparent limit of elasticity $E_{ac} = 2$ kg. per mm.² (2,845 lb. per sq. in.), which, owing to the condition of the test, can

pression, there is a slight permanent contraction of 0.013 per cent (the total contraction under load being 0.16 per cent), but to place it in evidence, it is necessary to have the measurements taken at about 1/50,000 of the length.

Bar Test

Comparison with Tension Test.—The bar test has not yet been employed for the grading of castings. Moreover the exactness of the tension test, such as it is, would make worthless the comparison of the results obtained. Consequently the results of the precision tests made by Mr. Portevin present considerable interest as regards determining whether the bar test gives indications of any value, in relation to the strength under tension, compared to the strength of the castings.

If we take the figures of Table I, we see that the results obtained tally in a remarkable manner. This shows that there does exist a relation between the results of the bar tests and tension tests, when the latter are correctly made. The empirical formula giving this relation is:

$R_t = 0.2 \Delta - 13$

Comparison with Compression Test.—Here we have a much larger number of determinations. Fig. 19 shows

Table II—Mechanical Tests
(Tension and compression on semi-steel at 25 kg. per mm.² of tensile breaking strength)

Nature of the Test	Mark of the Test Bars	Limit of Proportionality	Limit of Apparent Elasticity	Deformation				Modulus of Elasticity
				Load at Rupture	In Length		In Section at Rupture	
					At the Limit of Proportionality	At the Rupture		
		(1) Kg/mm ²	(2) Kg/mm ²	Kg/mm ²	(3) %	(4) %	(5) %	Kg/mm ²
Tension	TB. 1	3.25	21.5	21.5	0.0256	0.384	0.16	12,700
	TB. 2	4.06	26.5	26.5	0.0332	0.597	0.16	12,250
	TB. 3	3.65	25.5	25.5	0.0289	0.540	0.16	12,650
	Mean	3.65	24.5	24.5	0.029	0.5	0.16	12.5x10 ³
Compression	CB. 1	13.0	32.0	90.0	0.115	16.0	34	11,300
	CB. 2	11.2	32.5	89.3	0.105	16.2	31	11,800
	CB. 3	10.6	32.8	90.8	0.086	16.4	37	12,300
	Mean	11.6	32.4	90	0.1	16.2	34	11.9x10 ³

- (1) Result by defective material.

(2) Related to the diagrams registered on the testing machine.

(3) Taken with the method of mirrors.

(4) Taken on 56 mm. (2.2 in.) in length. Results obtained by interposing lineally the last results given by the mirror method and by direct measurement of the compression test bar.

(5) Taken by breaking tension bars and at the center of the length of the compression bars.

be given as maximum and minimum limits of the actual limit of elasticity.

Hence it can be said that, for a semi-steel casting at 25 kg. per mm.² (35,500 lb. per sq. in.) of breaking load at tension, the limit of the permanent deforma-

the relation and indicates that there is a sufficient correspondence between the Brinell number, the resistance at compression and the elastic limit at compression, determined, as above, on cylinders of 16 mm. diameter by 16 mm. length. The relations are expressed by the empirical formulæ:

$R_c = 0.5 \Delta - 5$
 $E_c = 0.4 \Delta - 25$

Fig. 20 shows graphically the relation between the three values of R_t , R_c , E_c .

It must always be borne in mind that these bar tests were taken on machined shells, and that it is possible that some precautions are necessary to avoid errors when the test is made on rough cast bars. However, this test, which is so simple, is one of the most interesting ones if it is proved that it applies to ordinary castings, as it probably does.

These advantages prove that the test is simple, speedy, low priced, and that it entails no damage to the shell. It can be repeated as often as is desired and it admits of exploring the mass of the metal at any spot. It is individual and therefore grades the casting to be tested and not merely a test bar run off separately. Finally, it leaves an indelible mark, grading the value of the manufactured product itself.

Conclusion

In conclusion the author calls the attention of the parent societies to the importance of the methods here shown for the progress of the art of the foundry. The methods employed heretofore were expensive and uncertain. It can be said that, provided an understanding is reached in a very short time between the societies interested, for standardizing the test bars and the conditions of testing, a considerable mass of data will be established.

tions at compression is between 10 and 30 kg. per mm.² (14,200 and 42,650 lb. per sq. in.). In fact, under a load of 20 kg. per mm.² (28,450 lb. per sq. in.) at com-

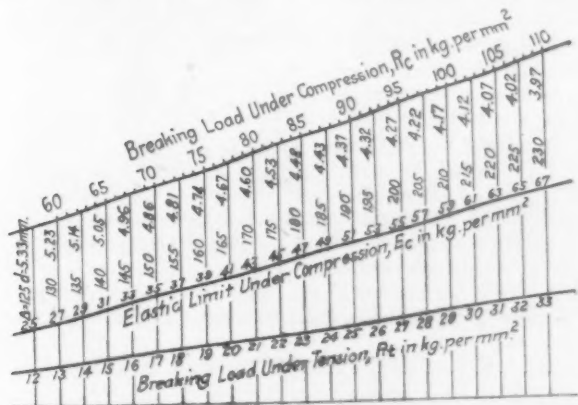


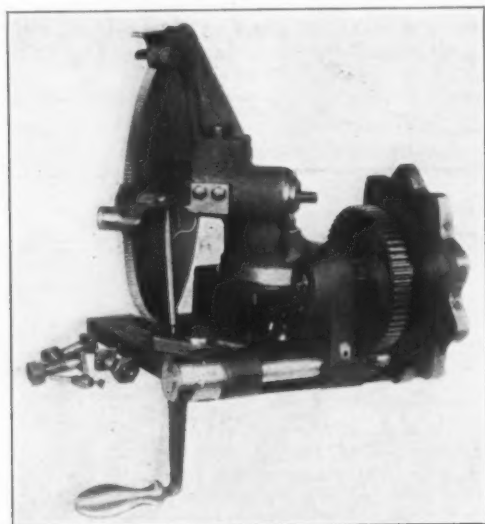
Fig. 20—Graphic Relations Among the Three Values of R_t , the Breaking Load under Tension, R_c , the Elastic Limit under Compression and E_c , the Breaking Load under Compression, as Compared with the Brinell Hardness Number Δ or the Diameter d of the Imprint, Using a Bar of 10 mm. (0.4 in.) under a Load of 3000 kg. (6600 lb.) From these relations,
 $R_t = 0.2 \Delta - 13$
 $R_c = 0.5 \Delta - 5$
 $E_c = 0.4 \Delta - 25$

Fixture for Graduating Beveled Dials

The fixture shown in the accompanying illustration, intended primarily for the graduating of beveled dials used on condensers for radio work, but adaptable also for other graduating work, has been placed on the market by the George Gorton Machine Co., Racine, Wis.

The indexing is positive and automatic, and any number of divisions up to 360 can be indexed. The crank is keyed to the lower shaft as shown and turns clockwise. The lower shaft has a small pinion on the inner end meshing with the gear on the upper shaft, to which shaft is also keyed the cam wheel, which transmits motion to the work holder mounted in a dovetail slide in the base. A stop is provided on the indexing wheel which will limit the graduations to any predetermined portion of the circumference. As the indexing movement stops exactly at the proper place, it is claimed no work will be spoiled even though the operator is not at the machine.

The points on the cam are made to suit the length of lines on the work to be graduated and if certain lines



Graduating Fixture. Indexing is automatic, and any number of divisions up to 360 may be indexed

are longer than others, that also may be taken care of. If each tenth line is longer, then one point on the ten-point cam will be proportionately longer than the other points. If every fifth and tenth line is longer than the others and also different from each other, then two points on the ten-point cam opposite each other will be longer in whatever proportion is necessary. If every fifth point is longer, a five point cam will be used and one point will be longer than the other four.

When cutting steel the spindle runs at 2000 r.p.m. The spindle speed for parts of cast iron is 2000 to 4000 r.p.m. and for brass and bakelite 4000 r.p.m. In the case of cast iron and bakelite dials the cut is said to be clean, no burrs being raised, and further operation unnecessary.

On dials of approximately 3-in. diameter and having 100 graduations on one-half the circumference, the actual time for cutting the graduations is said to be 40 sec. or less. Graduated around the entire circle, the time would be 80 sec. or less. As the time for changing the pieces should not be great, each piece should not require more than 1½ min., which would give a production of 320 per eight-hour day.

Under the title "Water Deactivation," Dr. Frank N. Speller, metallurgical engineer, National Tube Co., Pittsburgh, recently contributed a paper to the Engineers Society of Western Pennsylvania. This paper, which covers the development of means for the control of pipe corrosion by the removal of free oxygen from the water, has been printed in the July proceedings of the society and may be obtained for 50 cents a copy by addressing the society at the William Penn Hotel, Pittsburgh.

International Conference on Standardization

A conference of the secretaries of national industrial standardizing bodies was held in Switzerland, July 3 to 7. Thirteen countries were represented, including all of the more important industrial nations of Europe and America. The sessions were held in Zurich and in Baden.

A leading topic discussed by the conference was the interchange of information between the various national bodies during the development of the work in the different countries. At the first conference, held in London two years ago, arrangements were made for the systematic interchange of completed work, and, to some extent, of information on work in progress. Experience had shown such an early interchange to be extremely important for the work within the different countries from the national viewpoint alone, and quite irrespective of the question of international standardization.

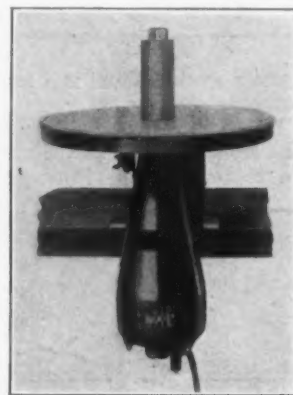
Provision now has been made for continuing the work of the conference on the many administrative problems of common interest, through a loose-knit continuing organization. An example of such work planned by the conference is the translation of technical terms of special importance or difficulty in standardization work. There will gradually be built up such a vocabulary of technical terms, mainly in English, French and German, but supplemented as far as may be feasible and necessary by the corresponding terms in other languages. Another example is the work undertaken by the conference on the classification and nomenclature of standards.

The conference was attended by Dr. P. G. Agnew for the American Engineering Standard Committee.

Bench Spindle Sander for Pattern Shops

An oscillating spindle sander intended for use in pattern or woodworking shops where there is not enough internal or irregular work to justify employing its larger machine, previously offered, has been placed on the market by the Porter-Cable Machine Co., Syracuse, N. Y.

The bench style machine is illustrated herewith, but a pedestal type is available if desired. The motor, which is of General Electric Co. manufacture, is totally inclosed as shown, and has a speed of 1725 r.p.m. It is connected direct through the spindle, which has an oscillating movement of 1 in., is equipped with ball bearings and provided with a 2¼ x 6 in. roll. The table of the machine is ground, is 16 in. in diameter, and is arranged to tilt 45 deg. down and 15 deg. up. The overall dimensions are 16 x 16 x 25 in., and the weight of the machine 75 lb.



Bench Spindle Sander for Use in Place of Larger Machine

The American Chamber of Commerce of Sao Paulo, Brazil, offers its services to American manufacturers in the matter of trade investigations and reports, in securing a representative or agent to furnish credit reports, in supplying trade mailing lists, arranging for the display of samples and in receiving catalogs of manufacturers. The address of the chamber is Caixa Postal 1527. K. Oberg, manager Ford Motor Co., is secretary.

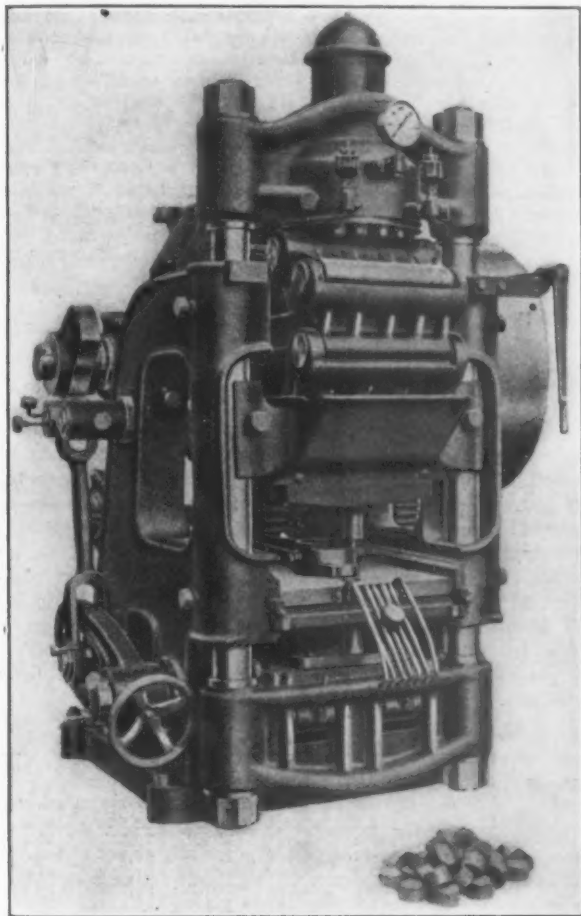
Sales of mechanical stokers in July involved a total of 52,518 hp. against 59,719 hp. in June, being the smallest monthly total so far this year. The average for the first half of the year was 77,400 hp. per month.

DUST AND METAL BRIQUETTING

De Gama Process for Recovery of Metal Turnings, Blast Furnace Dust and Ore Fines

From France has been brought into this country a briquetting process which appears to produce a briquet of unusual density without the application of moisture, heat or binder. The process is emphasized as being solely physical without involving chemical reactions, the results being obtained by means of a briquetting press employing unusual, if not new, principles. Marked success is claimed with flue dust and fine ores as well as with steel, cast iron or non-ferrous turnings and borings.

The process was developed out of war necessities



De Gama Machine for Briquetting Flue Dust or Metal Turnings Develops a Pressure of 660,000 Lb.

for steel in France by D. V. de Gama, a mechanical engineer of Portuguese origin and a graduate of the Universities of Paris and Madrid. He has now come to the United States with the idea that he can interest blast furnace plants in his method of handling flue dust and also large melters of borings and turnings in his briquetting of metal. The work may be done at point of production of the turnings or at point of melting, such as the foundry cupola or the blast furnace or the open-hearth furnace. Mr. de Gama has established an office at 347 Madison Avenue, New York.

From Theodore Kappeler, a mechanical engineer graduated from the Polytechnical University of Zurich, at present in this country, has been obtained some information regarding the development of the process in Europe. The de Gama process, patented under the name of "Procédé de Gama pour l'agglomération des tournures, minerais et résidus métalliques à sec, à froid et sans agglomérat" (de Gama process for the agglomeration of turnings, ores and metallic residues, dry, cold and without binding material), has been in use in France since 1913 and "it gave remarkable results, both technically and economically, during the world war." It was introduced in France, according to Mr. Kappeler,

by a company formed under the name of "Société des Etablissements et pour l'Exploitation des Procédés De Gama." This company installed factories at Paris, Puteaux, Fumel and Feuquières, where the briquetting of the different materials was accomplished.

"Instead of using the principle of briquetting material by shock, that is, sudden pressure from one side only, the de Gama process eliminates the air between the particles, using a pressure of approximately 154,000 lb. per sq. in., applied in a special way. This pressure is automatically equal on each side of the briquet and works in a progressive and uniform manner. The geometrical center of pressure at all times is at the geometrical center of the briquet. For the elimination of the air between the particles in the briquet, a special and patented device was designed."

The briquets have been used, he says, by the Acieries de Longwy, Hauts Fournaux de Pont-a-Mousson, Société de Commentry Fourchambault et Decazeville, Acieries de Micheville, Société de Construction des Batignolles, Hauts Fournaux et Acieries du Saut du Tarn, Société de Chatillon Commentry et Neuves Maisons, Acieries de France, Société de Construction de Fives, Lille, Laminoirs de Frouard, Société de Senelle Maubeuge, Hauts Fournaux de Caen, Forges et Acieries de l'Ariège, and others.

They were employed for the manufacture of the fuses for the famous French 75-mm. shells, also for shells of 155-mm. and 280-mm. guns. They were utilized for the manufacture of gun barrels and field guns, in the latter case the briquets being made from specially selected high grade steel turnings.

The briquets are well adapted to loading and the unloading of cars by means of electromagnetic cranes. In the open-hearth furnace 40 per cent of the charge can be made with de Gama briquets. In the cupola the charge of these briquets may be as high as 50 per cent. In the case of cast-iron briquets, the foundries used to send their own turnings to the de Gama factories to be sure of the composition of the briquets returned to them. Shops in southern France sent their turnings at the rate of approximately 300 tons per day for several months to the nearest de Gama plant, to be transformed and returned, traveling a distance of 900 miles.

The accompanying illustration is a photograph of one of the presses. One of the features is that the table or platen containing the dies is in a measure floating within the machine so that the pressure brought to bear against the material being briquetted is applied in opposite directions, meeting the claim suggested by Mr. Kappeler that the geometrical center of pressure is at the geometrical center of the briquet. Another feature is that what corresponds to a shaking or agitation of the briquetted material is provided for to assist in driving off the air and bringing all particles into the intimate contact required for the density and cohesion desired. A given press may be arranged to produce two or three briquets simultaneously, so that large output may be achieved.

Mechanical Analysis of Foundry Sand

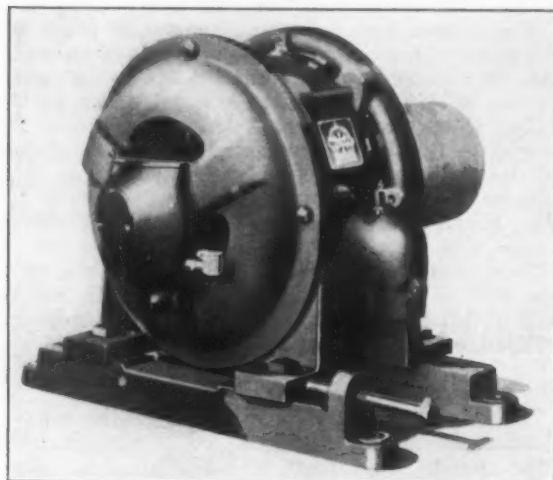
A mechanical analysis was recently made, using the air analyzer of the Bureau of Standards, of a sample of foundry sand which contained coal particles and coal dust. This sand had been sent with a request for some method of removing the coal so that the sand could be used again in the foundry. The results of the mechanical analysis indicated that the coal could not be effectively cleaned out of the sand by means of air separation. It is probable that in cases of this kind some method of washing must be used.

Electric hoist business in July, according to the Electric Hoist Manufacturers' Association, E. Donald Tolles, secretary, 165 Broadway, New York, was 12.95 per cent less in the number of hoists than it was in June and 12.85 per cent less in the value of hoists ordered. Shipments of hoists decreased 18.27 per cent as compared with shipments in June.

New Line of Induction Motors

A new line of induction motors designated as the type AA, for two and three phase alternating current circuits, has been placed on the market by the Reliance Electric & Engineering Co., Cleveland.

In the new machines the frames of motors up to 25 hp., 1800 r.p.m., are of riveted construction. The stator punchings are assembled with the end flanges under 10 tons pressure, and large rivets are inserted, the ends electrically heated and upset. The contraction of the rivets in cooling is said to aid in making of a tight and rigid core. The feet are cast integral with the flanges and the bottoms of the feet are planed parallel to the shaft. This operation and the machining of end flanges



New Squirrel Cage Induction Motor for Two and Three-Phase Alternating Current Circuits. The end brackets protect the motor winding

for the bracket fit are done after the riveting of the stator, which is intended to assure correct alinement. The slots in the stator punchings are semi-inclosed. Liberal opening at the top of the slot is said to facilitate winding and increase the overload torque capacity of the motor.

The wound stator is dried out in an oven and while hot is immersed in insulating varnish for 30 min., after which it is baked for 10 hr. This complete operation is repeated twice, making three treatments of insulating varnish, the winding then receiving a brush application of air drying varnish.

Bearing brackets protecting the heads of the stator coils are of rugged construction and are designed to guide the air from the rotor fans around the ends of the stator windings. A deep oil well with a pocket into which sediment may drain is provided in the bearing housing. An oil hole cover of the self closing type is provided, and the opening at the outside end of the bearing housing has a metal cover to keep out dust and dirt. Bearings are of phosphor bronze and are shouldered in the end bracket and locked against rotation. Oil is drained from pressure relief grooves at the ends of the bearings through a 3/16-in. hole and oil-throw collars are provided to prevent oil from creeping along the shaft.

The rotor core is made up of special sheets punched to receive the rotor bars, which are of hard drawn copper. An end ring of copper cast on to the extensions of the bars is said to make the rotor practically indestructible at a point which usually has been the cause of breakdowns. Fans at each end of the rotor core assist in ventilation.

The motors are regularly equipped with outlets for conduit wiring, and in making the connection the outlet is entirely removed, giving free working space. For motors of 7½ hp. and above, a Cutler-Hammer bulletin 9141 auto-transformer starter is included in the regular equipment.

A carving knife made in 1868 of Disston steel, in use in a household in Brooklyn, N. Y., is illustrated in the August issue of the *Disston Crucible*.

German Metal Workers Seek Employment in United States

How the depreciation of European currencies and notably the German mark is restricting emigration to the United States is indicated in a letter received by an American company in the Central West from a German mechanic. This letter, written in English, indicates that the writer and many others like him are anxious to seek work in this country, but are unable to accumulate the necessary funds to pay for their passage. The communication reads as follows:

Rothenburgerstr. 30A
NUREMBERG (Germany), July 2, 1923.

Gentlemen:

I was told that in the large works of the metal industry of the United States is a great want of apprenticed laborers and skillful Germans, and that there would be a chance to become employed.

Some colleagues and I, tall and strong men in the 30's, apprenticed mechanics and turners, wish to emigrate to America, but we have not the necessary means. We would be quite willing to bind ourselves, if there would be granted an advance for the passage, which could be deducted from our wages on commencing working. We therefore take the liberty of asking you whether you are in want of such men. Should this be the case, you may apply, for security's sake, to the office of the Hamburg-American Line, Nuremberg, Koenigstr., with which we have already put ourselves in connection.

We would be very much obliged to you in favoring us with an early reply.

Yours faithfully,

HEINRICH RUPPRECHT.

Bookings of Steel Castings in July

WASHINGTON, Aug. 20.—The Department of Commerce announces that July bookings of steel castings, based on reports received by the Bureau of the Census, by companies representing over two-thirds of the commercial castings capacity of the United States amounted to 52,066 tons, as against 84,878 tons in June. The following table shows the bookings of commercial steel castings for the past seven months by 65 identical companies, with a monthly capacity of 96,900 tons, of which 38,300 tons are usually devoted to railroad specialties and 58,600 tons to miscellaneous castings.

Month, 1923	Total		Railway Specialties		Miscellaneous Castings	
	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity	Net Tons	Per Cent of Capacity
January	100,605	103.8	47,879	125.0	52,726	90.0
February	90,152	93.0	39,845	104.0	50,307	85.8
March	143,564	148.2	76,409	199.5	67,155	114.6
April	90,968	93.9	39,610	103.4	51,358	87.6
May	89,493	92.4	38,788	101.3	50,705	86.5
June	84,878	87.6	42,773	111.7	42,105	71.9
July*	52,066	53.7	16,741	43.7	35,325	60.3

*Two companies with a capacity of 785 tons per month on miscellaneous castings now out of business.

British Pig Iron and Steel in July

LONDON, ENGLAND, Aug. 20. (*By Cable*).—The pig iron and steel production in July showed a decline from June and a further decline from the heavy output in May, its peak of the year. In July 665,100 gross tons of pig iron was made, which compares with 692,900 tons in June. The July output is the third largest this year. The steel ingot and castings output in July was 624,300 tons, a decrease of over 43,400 tons from June. The July figure is the largest for this year.

Comparative data for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	639,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
January, 1923.....	567,900	634,300
February.....	543,400	707,100
March.....	633,600	802,500
April.....	652,200	749,400
May.....	714,200	821,000
June.....	692,900	767,700
July.....	655,100	624,300

To Propose Terms for Defining Tin Plate

Conference of Makers and Cannery Discusses Ways to Classify Tinned Container Material—Discoloration of Preserved Foods Baffling

WASHINGTON, Aug. 21.—The conference concerning the quality of tin plate at the Bureau of Standards last Wednesday voted to appoint a committee to propose standard terms for use in contracts for the purchase of tin plate, and also to classify grades of and adopt standard terms for waster plates. The committee is to be appointed from the different groups attending the conference and is to report back to their respective parent organizations. At the conference, which was presided over by Director G. K. Burgess of the bureau, were about 100 representatives of the interests concerned. They included manufacturers of tin plate and cans and cannery, and wholesale grocers.

It is the view of manufacturers that the outstanding feature of the meeting was the opportunity given them to reply to and refute charges of cannery and wholesale grocers that spoilage of food products packed in tin cans was due to the quality of the tin plate and cans used. It was readily conceded by both cannery and grocers that American mills make as good tin plate as is manufactured anywhere in the world. They had, however, persistently held out that imperfections in the plates and cans were due to the quality of steel used, and this contention, which has been the subject of exhaustive technical research involving every conceivable mill and laboratory test and all kinds of experiments for the past 15 years, finally resulted in the National Cannery Association's filing a brief with the Bureau of Standards in which charges were made against the quality of tin plate.

Position of Bureau of Standards

It was the purpose of the association to develop a movement to have the Bureau of Standards set up standards concerning the quality of tin plate and a uniform standard of tin coating. While Dr. Burgess had suggested to the conference the selection of a joint committee to make further research and determine facts looking to the possible importance of inspection in the manufacture of tin plate and improvements in other fields, he pointed out that the bureau had no police powers over the matter and that it was essentially a service bureau. Its research, he explained, is along cooperative lines to consider all problems concerned, whether of an experimental nature or otherwise. He made it plain, however, that the bureau would not take up the matter unless there was unanimous agreement among the various interested parties to do so, such an agreement to be arrived at on the basis of actual facts revealed at round table conferences. It was suggested that these facts be developed from further research, supplemented by a brief compilation of those already gathered by the Government and private organizations through past researches. This was not adopted.

Dr. R. A. Baker of the American Can Co., who vigorously defended the quality of both tin plate and tin cans, said frankly that he had become tired of research studies which his company has pursued vigorously, and, he pointed out, apparently without any great amount of interest being shown in them. He also maintained that nothing more than already is known would be learned and that therefore the effort only would involve a great amount of work and expense.

Sentiments of like character were expressed by W. D. Collins, formerly of the bureau of chemistry, Department of Agriculture, but now with the United States Geological Survey, who stated that he had been engaged in research work of this kind for 10 years and that it was his conclusion that no one knows what causes discoloration of food products against which the National Cannery Association, through its committee, headed by Dr. W. E. Elwell of Portland, Me., complained.

He suggested that if anything by way of further research be done that it be through a careful and fundamental study of the characteristics of steel. He declared, however, that in view of the many studies of this kind that already had been made and the numerous tests of a base for the manufacture of tin plate, there was no assurance that the problem can be solved.

Amount of Tin Coating Declared Not a Factor

Others who were equally doubtful as to the ability of anyone to reach a solution, said that instead of steel's being at fault, tests indicated that discoloration, which, it was stated, affected sweet corn more than any other product, seems to be due to the chemical reaction of the product packed. Curiously enough, it was pointed out, as an instance, that corn from two adjoining fields in cans with identical steel properties and tin coating, had developed entirely opposite results. In the case of corn from one field, there was no discoloration, while in the case of corn from another field this objectionable characteristic showed up quickly. This was assigned as one reason that some unknown chemical reaction is responsible for discoloration. It was charged that spoilage of food in some instances was due to poor merchandising. The declaration was made that experiments had shown that waster spots are not responsible for discoloration. Cans known to contain such spots were filled and the location of the spots was marked on the outside. In no case was discoloration found to have taken place near a waster spot, showing that the spot appeared to be a protection against such discoloration rather than a cause of it.

Mr. Collins, in declaring that no one knows what makes discoloration, made the interesting statement that tests had been made showing discoloration was greater in some cases in cans running 3 lb. of tin to the base box than in cans with only 1½ lb. to the box. Both tin plate manufacturers and tin can makers denied vigorously that the amount of tin coating had anything to do with the matter of discoloration and said that it had but little to do with the matter of perforation.

Position of Tin Plate Manufacturers

A clear statement of the position of tin plate manufacturers was made by Vice-President S. A. Davis of the American Sheet & Tin Plate Co., Pittsburgh. While he said that defects in tin plate can be minimized by careful work, he asserted that they cannot be entirely eliminated. He stated that changes in tin plate in the past had proved satisfactory and that changes in mill products are not advisable because they are now entirely adequate. He told the conference that it would be impossible to maintain exact uniformity without discarding 40 per cent of each ingot.

Apparently Dr. Burgess was impressed with the views of Mr. Davis, as shown by a statement he subsequently made in which he declared that the problem was not merely technical but also had an economic phase and that if further improvement in the manufacture of tin plate were to be proposed, it would be necessary to take into consideration added costs that would have to be passed on to the consumer.

Dr. Baker, in replying to charges about the use of waster plates employed in the manufacture of tin cans, readily admitted that they are so used and with equally as good results as when prime plates are used. He pointed out, however, that as a matter of course the waster spots are first removed before the steel is used in the manufacture of cans. E. E. Gibbs of the Southern Can Co., Baltimore, strongly defended tin plate producers in refuting charges of cannery and grocers and

declared that the quality of tin plate both as to uniformity and its steel base, as well as in other ways, has been constantly improving and is of a high grade.

Cause of Discoloration of Food Products

Replying to a question by Dr. Burgess as to whether there was a variance in the quality of tin plate produced by different mills of a company, President E. R. Crawford of the McKeesport Tin Plate Co., McKeesport, Pa., said that the quality of tin plate is practically standard without regard to the manufacturer. It was pointed out by Dr. Baker in answering charges of Dr. Elwell and others respecting heavy spoilage of food due to defective cans, that can makers guarantee that not more than two cans out of 1000 will be defective and that if a greater number of defective cans are delivered, the canner is entitled to redress, because of grease, imperfect pickling, etc., declaring that it is not possible to avoid leakage altogether, and that there will always be a certain amount of seconds. He said that very few canners are complaining against the present cans being manufactured. He pointed out that the cans of today have an average of 0.262 split ends per 1000. This small number, Dr. Baker stated, does not justify sorting, because it would be cheaper to pay for the resulting food spoilage. It was also said that while a common form of food spoilage is black discoloration due to the formation of iron sulphide, this substance is quite harmless, although it spoils the appearance and taste of the food.

Claims that spoilage ran as high as 4.5 per cent, due to defective cans, were emphatically denied with the statement that from this cause the percentage does not

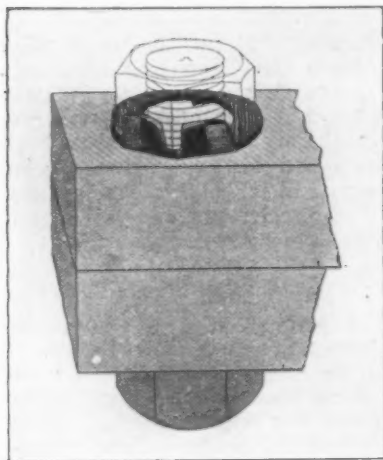
exceed $\frac{1}{4}$ per cent. There was a great deal of interest shown in the statement of one spokesman that the controlling factor in black discoloration is evidently "hydrogen sulphide and colloidal conditions in which it comes down to make iron sulphide, and so far no way has been found to overcome this reaction." Denial was made of charges of inadequate inspection, but it was pointed out by both tin plate manufacturers and can makers that they were just as anxious as canners and foodstuff interests possibly could be to eliminate any evils that exist.

Demand for Change in Tin Plate Terms

Dr. Elwell in an addendum to the brief of the National Canners Association, pointed out what the canners sought. In the course of this statement he reiterated charges that a considerable percentage of tin plate manufactured is of inferior quality, estimated at 15 to 30 per cent. He urged proper inspection and selection of sheet bars and the careful sorting of plates before tinning. He expressed the hope that the bureau would find it practicable to make a study of the various grades of tin plate and develop standard terms applicable to each. He stated the term "coke plate" under present day practices is a misnomer because coke no longer is used in its manufacture. He suggested the discarding of this term and the substitution of a more definite one and added that a similar criticism may be justly applied to the terms "charcoal plate" and "canners' special plate." He explained that charcoal is no longer used in the manufacture of tin plate and that canners' special "is not especially good for canners." He declared that the term "waster" is too general in its application.

Device for Keeping Nuts Tight

The nut lock shown in the accompanying illustration, which is being marketed by the Waynesboro Nut Lock Co., Inc., Waynesboro, Pa., is intended for use



where nuts are subject to unusual shock or vibration. Special bolts or nuts are not required and the lock nuts may be applied with an ordinary wrench.

The device is said to operate on the principle of the alligator wrench, and may be tightened up but cannot be backed off. Upon tightening the nut the tooth en-

gages the thread thereby preventing the nut from moving backward even with a wrench, and on account of the tooth having a rake or being located angularly to the center, the greater tendency to back off the tighter the lock becomes. When pressure is applied in the direction of tightening the nut, however, the tooth recedes and permits the nut to be tightened, after which the lock will function as before.

In a test of the device a rail joint made up with six bolts, equipped alternately with the lock illustrated and the usual split spring washer, was supported under a 2000-lb. hammer operating at the rate of 130 blows a minute for $1\frac{1}{2}$ hr. It is claimed that at the end of this time it was found that the joint had stretched $\frac{1}{2}$ in., thereby forging the bolts and causing them to become loose. A continuation of the hammering caused the nuts held by the spring washers to come off, the nuts illustrated remaining in their original positions. In a second test the bolts with spring washers were tightened with a wrench so that the spring washer was clamped to half its compression, the bolts equipped with the nut lock illustrated being merely screwed up

by hand. The same hammer blows and weights were used as in the first test and it is claimed that the nut held by the spring washers came off four times, the nuts equipped with the nut lock illustrated remaining in their original position.

American Engineering Standards Committee Accepts More Specifications

Three specifications of the American Society for Treating Materials have recently been accepted as standard by the American Engineering Standards Committee, 29 West Thirty-ninth Street, New York. They are: Standard specifications for staybolt, engine bolt and extra-refined wrought iron bars, A84-21; for refined wrought iron bars, A41-18; and for wrought iron plates, A42-18. The preparation of these specifications is said to have extended from 1905 to 1913.

The approval of these specifications adds an important group of metal specifications to those already approved by the A. E. S. C. in this field, which include the following:

Specifications for Cold Drawn Bessemer Steel Automatic Screw Stock;
Specifications for Cold Drawn Open-Hearth Steel Automatic Screw Stock;
Specifications for Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars;
Specifications for Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars;
Specifications for Soft or Annealed Copper Wire.

The village of Corliss, in Racine County, Wis., has been granted authority to change its corporate name to Sturtevant by the county board of supervisors. The change is made as a mark of appreciation of the municipality that the B. F. Sturtevant Co., Hyde Park, Boston, has acquired the principal industrial activity at Corliss, the works of the defunct Wisconsin Engine Co., and is now rehabilitating it as a Western production unit, which is expected to begin operations about Oct. 1. The village was originally named Western Union Junction, but in 1893 the name was changed to Corliss in honor of Brown-Corliss Engine Co., which erected a large plant at this point. This interest was succeeded in 1905 by the Wisconsin Engine Co., which failed in 1913.

NEW CENTERLESS GRINDER

Shoulder and Straight Cylindrical Work Ground Rapidly—Sixteen Feed Variations Provided

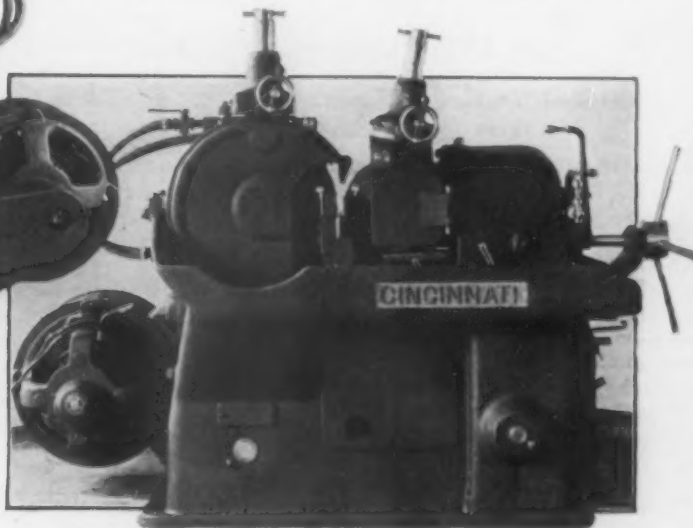
A new model centerless grinder, designed not only to rough and finish straight cylindrical parts at high speed and to the desired limit of accuracy, but intended also to grind shoulder work more rapidly than by any other method, has been brought out by the Cincinnati Milling Machine Co., Oakley, Cincinnati.

With the standard work rest the capacity is for work from $\frac{3}{8}$ to $1\frac{1}{2}$ in. in diameter, but an optional work rest taking diameters from $1\frac{1}{2}$ to 3 in. is available. The standard support blades take work up to 10 in. long. Accessories may be provided to permit grinding of work up to 8 ft. and longer, and diameters down to $1/16$ in.

The tilting control wheel for varying the feed per revolution, gear box for providing 16 speeds of the

a work rest between the wheels. The top of the support blade and the grinding wheel spindle are parallel to each other. The feed wheel is carried in a bracket which can be swung about a horizontal axis and clamped. Sizing is accomplished by moving the housing carrying the feed wheel forward in its slide to compensate for wheel wear. The work rest is universal to take care of work of different diameters, and means have been provided for convenient and accurate truing of both grinding and control wheels.

Work having shoulders, such as shackle bolts, yoke pins, king bolts, etc., is ground by the "straight-in feed" method. Where the portion to be ground is not more than 4 in. long a shoulder-grinding work rest is employed. The shoulder-grinding operation on a valve tappet is shown in the insert illustration. A 90-deg. movement of the lever in the operator's right hand moves the control wheel housing either forward or backward a distance of 0.030 in. When the wheel is withdrawn, the piece of work to be ground is placed upon the angular support blade and located endwise by an adjustable stop. As the lever is brought down the control wheel is moved forward and the work pushed against the grinding wheel, the desired size being secured when the lever has made its full movement. Coincident with the withdrawal of the control wheel by means of the lever, the operator pushes the ejecting knob, on which his left hand rests, and the finished piece is pushed forward into the pan. Rapid production



Tilting Control Wheel for Varying Feed Per Revolution; Gear Box Providing 16 Speeds, Universal Work Rest, and Provision for Grinding By Straight-In Feed Method Are Outstanding Features. The shoulder grinding of valve tappets is shown in insert at the left

control wheel, universal work rest for straight cylindrical work without shoulders, and the provision for grinding work by the "straight-in feed" method, are features of the machine.

Because the process of grinding is more nearly continuous on the centerless than on a center type machine, is a general reason given for the increased productiveness of the machine. Loss of time in loading and adjusting the wheel to the work is eliminated. It is also stated that heavier cuts may be taken because the work is supported by the control wheel at the point of grinding and extra operations, such as centering and the inspecting operations which follow, are eliminated. The amount of stock to be removed by grinding can be greatly reduced, which is said not only to save time but to reduce wheel wear.

Cylindrical work without interfering shoulders is ground by passing it transversely between two opposed abrasive wheels. As in the previous machine, the grinding wheel, which is 20 in. in diameter, is mounted on the left-hand end of the main bed of the machine, and feed or control wheel, which is 12 in. in diameter, is mounted opposite. The work is supported between the wheels by a work-support blade, which is mounted on

of work of accurate size and free from chatter marks is claimed, successful operation being attributed largely to the work being carried upon a fixed rest during grinding, there being no non-rigid elements anywhere in the set-up. Work having a slight taper can be ground by this method, with suitable adjustments.

The main frame of the machine carries the grinding wheel spindle and all of the driving mechanism. In the lower part of the frame there is a constant-speed shaft, which may be driven either from a line shaft or by chain from a motor mounted on the bed. The main grinding wheel is driven from this shaft by a 5-in. belt. The drive for the feed wheel is taken from the same shaft and transmitted to a speed box at the front end of the bed. From the last shaft in the speed box a variable speed drive by means of a $3\frac{1}{2}$ -in. belt is taken up to the feed or control wheel spindle which is mounted in a tilting housing. The housing is gibbed to a sub-slide to which it can be locked. The sub-slide carries the work rest. Both the control wheel housing and the sub-slide can be moved forward as a unit or individually by means of the pilot wheel at the speed-box end. The independent adjustment of the upper and lower sides is said to permit of obtaining the proper

working set-up rapidly, which is emphasized as important where machines are used on jobbing work. To compensate for wheel wear during grinding, the upper and lower slides are moved forward as a unit. Fine adjustment of the slides is by means of an auxiliary crank and dial reading in ten-thousandths of an inch. Drive shafts in the lower part of the machine are fitted with ring oiling bearings, and centralized oiling for practically all other bearings is a feature.

The grinding wheel spindle is a heat-treated chrome-nickel steel forging and is mounted in the main frame of the machine, a casting weighing about 4000 lb. The spindle bearings are of the half box type. The spindle is held down in the bearings by the downward pull of the belt. A feature is the automatic oiling device, which is made up of large disk-type splashers which dip in the oil reservoirs and carry the oil up to collectors in the bearing cap, from where it is distributed over the bearing. Glass indicators are provided for observing the operation of this device. Adjustable shoes are provided as a safeguard in case the main driving belt should break. End thrust is taken up by a double row self aligning ball bearing, and the spindle may be adjusted while running.

Independent truing devices are mounted on each wheel guard, and are always ready for use. The uni-

versal work rest is a cast iron block mounted on the lower slide, carrying the work-support blade and four adjustable work guides. The guides, which are of high-speed steel, may be removed for resurfacing. Each guide section may be adjusted and locked independently and with this construction change may be made from work of one diameter to another without dismantling the machine. The standard work rest is equipped with two blades, a flat top and a 45 deg. angular or knife edge blade. The wearing surface of these blades is of Stellite electrically welded to steel. The flat top rest is for roughing and the angular rest principally for finishing.

A centrifugal pump of 15 gal. per min. capacity is mounted on a removable tank at the rear of the machine and is driven from the main shaft. The bed of the machine at the grinding wheel end is shaped to form a primary settling basin. The overflow runs into a secondary settling basin on top of the storage tank, and from there into the removable storage tank through a cloth bag of special texture. The secondary basin and storage tank may be removed for cleaning, and the settling basin in the machine may be drained and cleaned with a shovel.

Individual motor drive is recommended. The weight of the machine, net, is 5000 lb.

BLAST FURNACE SLAG

Accepted by Testing Society in Recent Specifications for Concrete Aggregates

One of the important developments of recent years has been the greater use of blast furnace slag as an aggregate in concrete. It is significant that at the annual convention in June of the American Society for Testing Materials this kind of slag was accepted as a standard in two divisions of one committee, or committee D 4, on road and paving materials, and that the same committee admitted this material to tentative specifications in three divisions, while another committee, C 9 on concrete and concrete aggregates, passed upon this slag as a tentative standard. The annual reports of these two committees give full details of three recommendations and changes.

At the same convention a special paper was presented by Raymond Harsch, junior assistant testing engineer U. S. Bureau of Public Roads, entitled "Blast Furnace Slag as an Aggregate in Concrete," which discusses in a general way the methods used in the production of slag, as found in the field investigation of over 30 commercial plants. The results of tests are given in detail and include weight determinations of each size of material produced by each plant.

Specimens have been made for testing at the age of one, two and five years. A series of corrosion tests have been planned to determine the relative corrosive effect of slag, gravel and limestone aggregates upon reinforcing steel. The following general conclusions are interpreted from the data resulting from this investigation:

The unit weight of blast-furnace slag as produced commercially has little if any effect upon the structural strength or the wearing property of the resulting concrete.

A limit of 70 lb. per sq. ft. would admit practically every well-graded crushed slag product.

The gravel used in these tests is one of accepted quality and is considered to be of average strength. The limestone used for comparison with the slag is somewhat superior to the average limestone used for concrete. The strength of all of the slag concretes exceeded that of the gravel concrete. The average strength of the slag concretes is equal to the strength of the limestone concrete.

Because of the excessive chipping at the edges of the wear blocks, the wear test is not considered a very favorable indication of the resistance of concrete to wear. It is a means of comparing the value of various types of concrete subjected to the action of the shot, and is interpreted as such by the author. On this assumption, the wear-resisting properties of slag concrete are equivalent to those of the limestone concrete and superior to those of gravel concrete tested in comparison.

The physical properties of the slag when tested by the usual rock tests do not seem to be an important factor in determining the quality of the concrete made with slag as the coarse aggregate.

Gun Steel in Basic Open-Hearth Furnaces

A statement was recently made at a meeting of the Société des Ingénieurs Civils de France, according to *Engineering*, to the effect that in 1917 the French works manufacturing steel for 75-mm. (2.952-in.) guns by the open-hearth process started from a charge consisting generally of 10 per cent to 40 per cent of first class quality Swedish or Chasse pig iron with 10 per cent to 65 per cent of Swedish iron, puddled iron, or ingots previously obtained on a basic hearth, the complement consisting of gun scrap. At that time, the statement added, certain works in the Loire district deemed it impossible to manufacture steel for guns otherwise than upon an acid hearth and starting exclusively from Swedish iron with gun scrap, and in this view had stored the necessary material to the value of several millions of francs.

Lucien Arbel, the well-known steel manufacturer whose works are in Northern France, has qualified this statement in the society's proceedings; he says that since the year 1912 his works at Douai and at Couzon have manufactured steel for 75-mm. and larger caliber guns and, notably, all the elements for the first 370-mm. (14.567 in.) mortar built in 1914 at Bourges Arsenal, in open-hearth furnaces having a basic hearth, using a charge consisting simply of French hematite pig iron and forge scrap. This process of manufacture has given perfectly regular results, the percentages of sulphur and phosphorus being below 0.04 per cent; this same method of manufacture has recently been followed again in exactly the same conditions in the case of a series of 155-mm. (6.102 in.) gun jackets, which gave every satisfaction at the tests. Experience has shown that the steel thus manufactured in the basic open-hearth furnace is perfectly reliable in actual use, and as an instance Mr. Arbel adds that one of the 75-mm. gun tubes manufactured at his Douai works, removed from the service after firing the number of rounds considered a maximum for guns of this caliber, showed a degree of wear at the grooves below the established limit governing the removal of such a gun from the army. Mr. Arbel took advantage of the statement referred to in the foregoing for calling attention to the possibility of manufacturing gun steel, using the ordinary type of basic open-hearth furnaces; these latter are now much more frequently met with than acid open-hearth furnaces.

Features in Manufacture of Mack Motors*

Unusual Fixtures and Methods in Machining of Gasoline Truck Engines—Extended Application of Diamond Tools Giving Satisfactory Results

BY L. S. LOVE

IN the making of the helical timing gears, all blanks are annealed before cutting and the practice has been to test gears for concentricity of the pitch line before the gears go to heat treatment. They are meshed with master gears in a testing bench and must run within 0.003 in. It was found that to secure this accuracy it was necessary to cut only one gear on an arbor, thereby avoiding spring and chatter due to placing more gear blanks on an arbor and applying cutting pressure farther from the hobbing machine face plate.

After hardening, the bore and hub face are ground in an internal grinder. The work spindle of this ma-

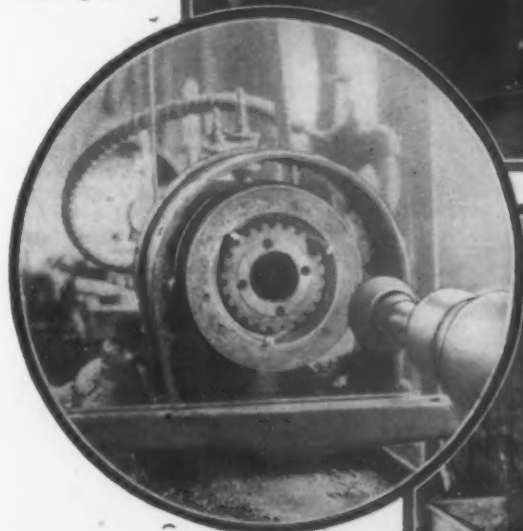
chine carries a ring chuck which fits the outside diameter of the gear. Three pins are placed about the gear between teeth at equi-distant points, and serve to center the gear on the pitch line and drive it as the chuck revolves. Flat wheels and cup wheels are used on the bore and hub face respectively.

The heat treatment of castings between rough and finish machining is also followed in the case of aluminum. Crank cases are slab milled from the rough. This operation is performed two cases at a time, one on the top edge, the other on the bottom. The one milled on the top is then turned over, registering in the other half of the fixture from the milled top, the

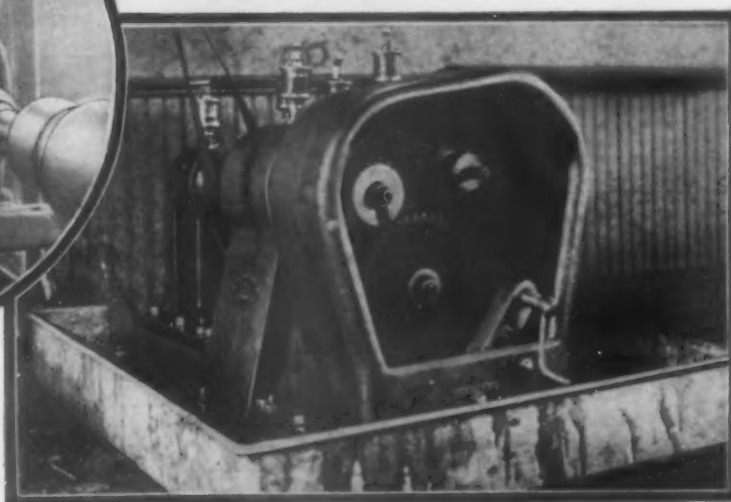
Timing Gears (At Right) Are Tested for Concentricity Before Going to the Hardening Process. On this test they must run true within 0.003 in. when meshed with a master gear



After the Bore Grinding Operation, Gears Were Lapped in a Special Machine. This operation is now superseded by a machine (below) just developed which grinds the helical teeth after hardening



It Has Been the Custom After Hardening Gears (Above) to Chuck Them in an Internal Grinder Registered From the Pitch Line at Three Points by Pins Inserted to Center the Gear and Drive It. Bore and face are ground



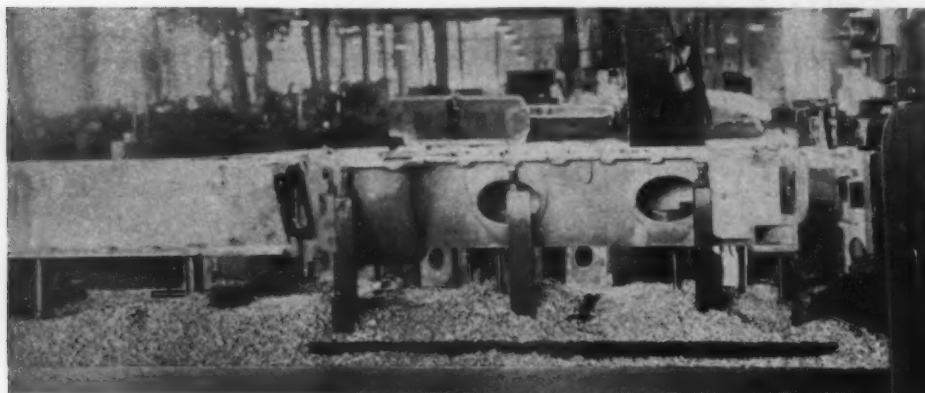
chine carries a ring chuck which fits the outside diameter of the gear. Three pins are placed about the gear between teeth at equi-distant points, and serve to center the gear on the pitch line and drive it as the chuck revolves. Flat wheels and cup wheels are used on the bore and hub face respectively.

After this operation these timing gears have been run through a lapping operation in a special machine built by the International Motor Co. for the purpose, when they were tied together in sets for assembly. The newest departure which will supplant some of the present operations is a gear tooth grinding machine

other case having been removed. This makes a completed case rough surfaced for every pass of the miller table. After this operation the cases are dipped for 15 min. in boiling water to remove strains. They are then stored until called for for the finish milling operation, which is handled in a similar fixture and manner.

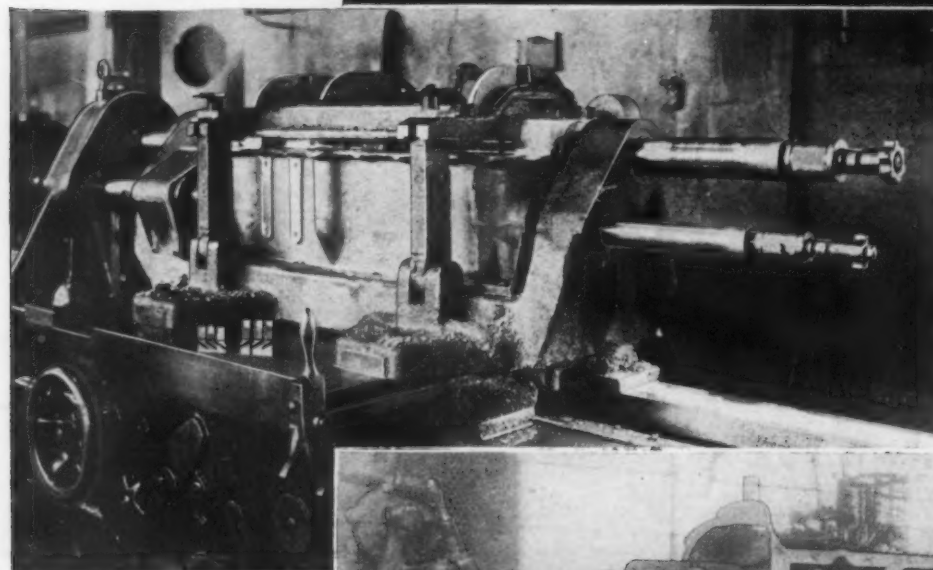
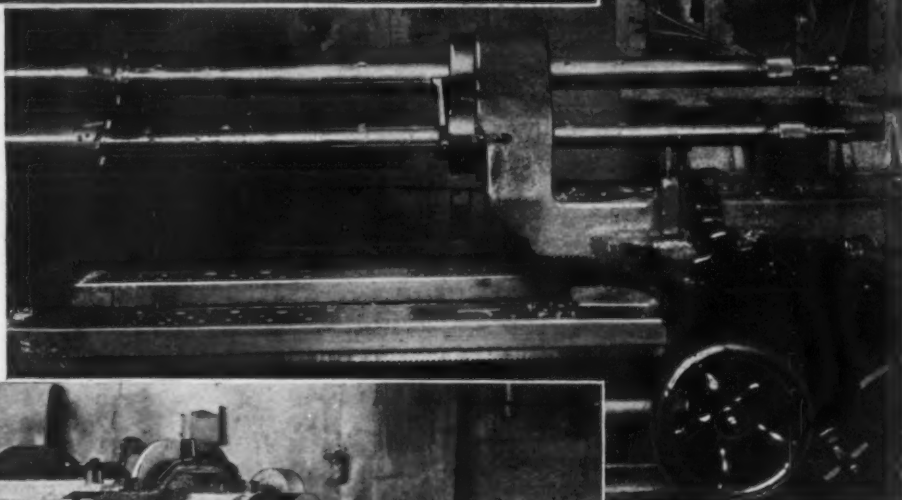
A specially built type of machine is used for boring the main bearings before the babbitt lined bronzes are inserted and at the same time boring the cam shaft bearings. This machine is a reconstructed lathe with a special bar driving head mounted in front of the lathe head and operated by a floating drive by the main spindle. This driving head is so geared that two bars of different diameters are rotated at proper speed for

*Concluded from page 392 of THE IRON AGE of Aug. 16.



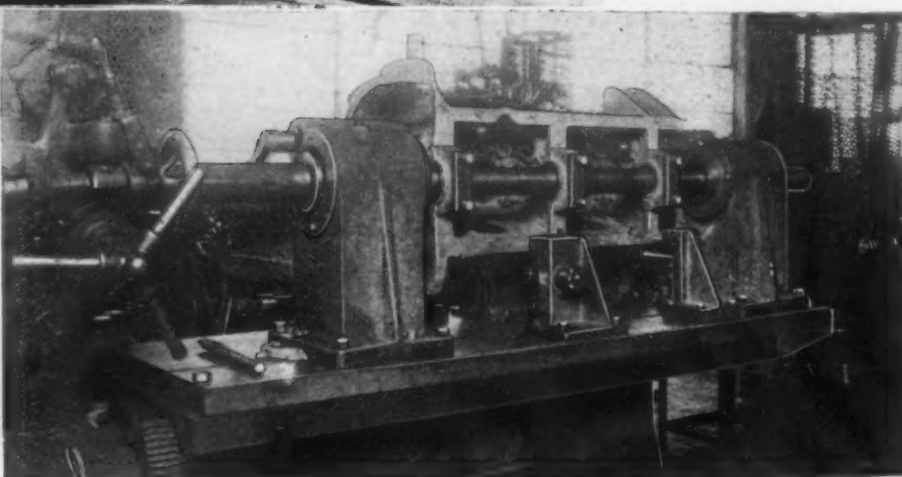
Aluminum Crank Cases Are Rough Surfaced in a Planer Type Milling Machine (At Left) Before Being Immersed in Boiling Water for 15 Min. to Remove Strains

Crank Bearings Before Receiving Bronze and Babbitt Liners Are Bored and Faced in a Special Boring Machine (At Right) the Bars of Which Carry Two Sets of Cutters, Either of Which May Be Set Out at the Will of the Operator by Adjustment at the End of the Bar



The Withdrawal Feature of the Cutters Permits Setting Up the Crank Case in the Cradle Without Removal of Bearing Caps. Both sets of cutters are then withdrawn and the bars inserted through cradle bushing and bearing, ready to extend the roughing cutters

Finish Boring of Crank Bearings Is Done in Babbitt Metal. A special fixture (at right) which supports crank case with cylinders bolted in place is operated by air cylinder. The boring bar carries diamond tools and is carried in ball bearing bushings which permit the high speed desirable for diamonds (right)



cutting on those diameters. The bars pass through bushings in a cradle type jig mounted on the carriage of the machine.

The crank case with the main bearing caps bolted in place is set in the cradle, ready for machining, when the carriage bearing the jig is traversed toward the head stock, the bars entering the work. These boring bars are unusual in that each carries two sets of cutters, one for roughing, the other for finish boring. These cutters, due to a cam action inside the bar and diagonal slots in the cutters proper, may be completely withdrawn into the bar, alternately or both sets simultaneously. This withdrawal permits the bars

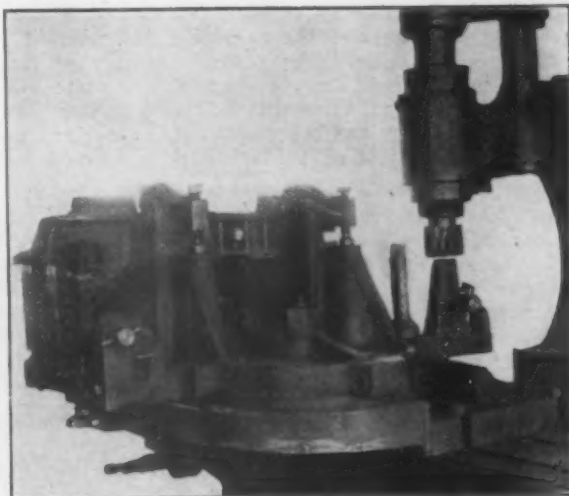
to pass through the guide bushings without removing the cutters. Withdrawal of one or both sets of cutters is effected through a star-type of hand nut at the end of the bar. Loosening the nut permits the cutter operating mechanism to be moved inside the bar and set in proper position by slots, in which a locating pin or key fits, when the nut is again tightened.

Thus, after the bar is in place, first the roughing cutters are extended, perform their functions and are withdrawn when the finishing cutters are extended, all in a minimum of time, without removing the bar or requiring another set up of the work. Micrometer adjustment of the cutters is possible by a knurled

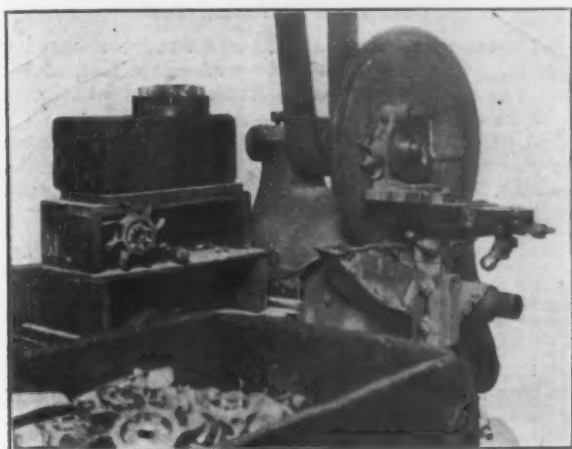
sleeve on the cutter adjusting bar immediately in front of the star nut. This adjustment is not effected by the cutter withdrawal or extension. Facing of bearings is also performed in this set up.

After the above operation is complete, the bronze bearings are put in place, and the babbitt liners finished to size by diamond tools running at high speed. This work has been done successfully for some time past, with diamond tools giving twice the old output. The limit to which these bearings are bored is plus 0.00025 in. minus 0.00025 in. Due to the fact that there is practically no wear in the diamond tools from 1 hr. to 1½ hr. are saved daily which was formerly needed for tool upkeep. A set of tools seen had been working day after day for six weeks, turning out 20 to 22 cases per day without any adjustment whatever and still holding to the limits demanded. How long this set of tools will last it is impossible to say. It is, however, superior to the ordinary method of line reaming formerly practiced, even though the fixture used be the same old line-reaming fixture, not built for high speed.

A new fixture for high speed has just been com-



Radiator Support Brackets Are Milled on Two Shoulders in a Vertical Milling Machine With Indexing Fixture, Making a Convenient Method of Machining a Bulky Casting



Difficulty in Sizing Water Pump Rotors Has Been Overcome by Grinding on a Disk Grinder with Suitable Fixture to Rotate the Casting

pleted. This will be used on a horizontal boring machine, with a speeder attachment at the front end of the spindle, so that roughing may be done at a speed obtainable from the changes in the machine driving mechanism. The high speed attachment may then be engaged to secure proper finish, which may best be done at high speed and fine feed, there being apparently no limit to the speed the diamonds will stand. In this changed operation, the cylinder castings will be attached to the crank case during the operation, so that the normal assembled strain may be on the case while being bored.

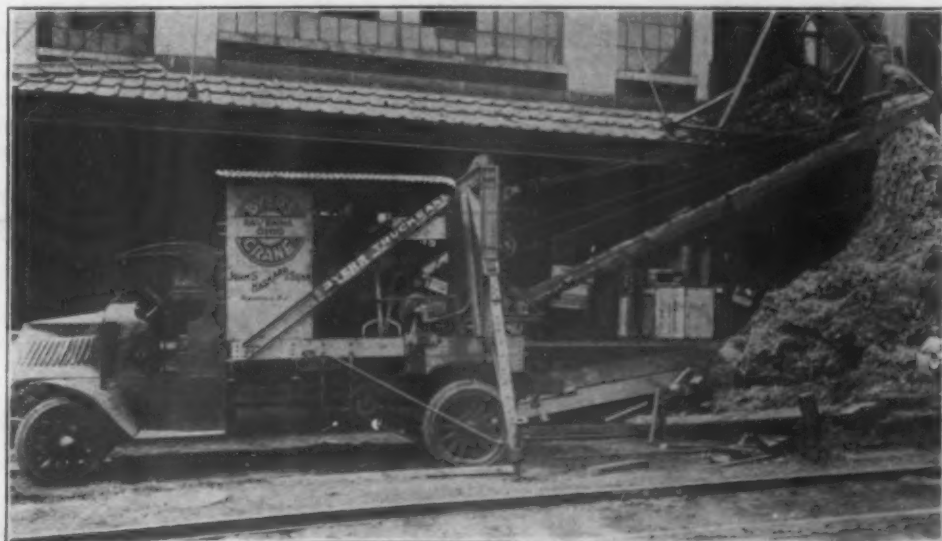
In the new fixture the job is placed with the bottom

of the crank case against a setting up stop at the right. The weight of the cylinders is carried on adjustable spring supports at the back. With the case in position, two beveled end locating plungers are inserted in the cam shaft bearing holes, thereby drawing the case to the proper position, when it is clamped on the lower edge at the center against a stop. This registers the job from three points. The locating plungers are actuated by a double acting air cylinder mounted at the rear between the fixture housing. This cylinder is controlled by a two way valve at the operator's position. The piston rod, through a series of links and gear segments, is connected with the two plungers. To permit the high speed desirable, the guide bushings carrying the boring bar are mounted in ball bearings.

It was found difficult to machine the bronze pump impeller castings used to circulate water for cooling the motor without distortion, due to the lack of rigidity in the vanes. A method has been worked out to not only face off the ends of the vanes to produce a rotor of proper diameter, but also to finish the sides to conform to a gage in both contour and as to width of shaft hub. A fixture is mounted on the table of a disk grinder. On this fixture the rotor is mounted by a draw-in bolt. As the table is rocked, the operator rotates the impeller by a pinion and gear mechanism in the fixture, thus grinding the sides of the vanes. A similar fixture set at right angles is used to finish the ends of the vanes.

A fixture which indexes 180 deg. on a vertical milling machine table is used in machining a shoulder on each end of motor and radiator front support brackets. The height of cutter is determined by a hardened stop block on the fixture, a shell end mill

A Lifting Magnet on the End of the Jib Crane Is Used for Loading Scrap into Freight Cars. A generator in the crane cab excites the magnet



being used. In this way an operation difficult because the piece is large and the operation insignificant is handled economically. The piece is quickly set and clamped by star head screw stops and rocker clamps.

A rather unusual method is employed at this plant in loading turnings and other scrap into cars for shipment. This consists of a Mack chassis on which is

mounted a jib crane. The crane is operated by an individual gasoline motor inside the crane cab. This motor also operates an electric generator which is used to excite a lifting magnet with which the scrap is lifted into the car. Out-riggers are set to steady the machine while operating. The truck is also used for spotting cars and may be used for other miscellaneous work.

How a Leather Belt Transmits Power

Considerations of Tension on the Two Sides of the Belt— Relation of Speed and Friction to Power

BY J. EDGAR RHOADS AND DR. R. R. TATNALL*

IN any belt drive the two factors of power are (1) speed, and (2) pulley traction or grip.

(1) More power can be transmitted by running the belt faster. Except for the centrifugal effect, the power would be proportional to the speed—twice the speed would give twice the power. But since the unfavorable effect of centrifugal action is proportional to the square of the speed, this soon over-balances the other and, beyond a certain point, power begins to decrease as the speed increases. Since the centrifugal effect depends on the weight of the belt, it is advantageous to use the lightest stock and the thinnest and

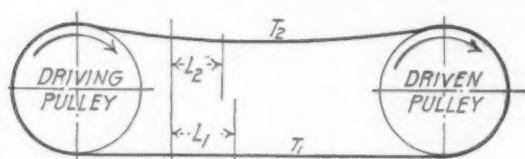


Fig. 1—Showing Relation of Tensions and of Creep in a Belt, Between the Driving and the Driven Pulley

narrowest belt compatible with sufficient strength and reasonably long life.

(2) The second factor of power is *grip* or traction. This is the same as the frictional force of the pulley on the belt, and is equal to the difference of tension between tight and slack sides, $(T_1 - T_2)$. The friction does not depend on the width of the belt, but does involve:

(a) Character of surface of belt—kind of leather, tanning, currying.

(b) Pulley surface—iron, steel, wood, paper, etc.

(c) Tension of belt, because this produces pressure of belt on pulley: the greater the pressure, the greater the traction.

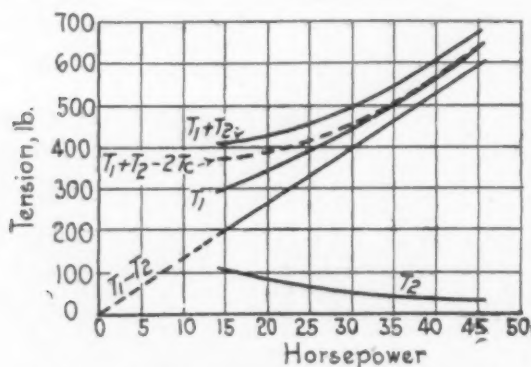


Fig. 2—Separate Tension Figures, and Their Derived Relations Bearing on Power Transmission, Plotted from the Data in the Table

(d) Arc of contact: the friction increases rapidly with the arc of contact, so that a small increase in arc gives a large increase of friction.

(e) The speed of creep and slip: friction between belt and pulley increases as the speed of slip or creep increases. In other words, the grip of the belt on the

pulley is better when slipping, and the faster the slip the better the grip, up to a certain point. Evidently this must be true, else after slip begins, one could not get more power—the belt would simply slip faster.

Data from an Actual Test

A 4-in. single leather belt was run at a speed of 2500 ft. per min. and made to transmit a load of 15.1 hp. The centrifugal tension at this speed was known to be $T_c = 17$ lb.

In the table, the first two columns and the last one, are observed, that is, obtained directly from the testing machine. The remaining six columns are computed from the data in the first two.

Data from Test of a 4" Single Leather Belt, Running at 2500 Ft. per Minute

Horsepower (p)	$T_1 + T_2$	$T_1 + T_2 - 2T_c$	$T_1 - T_2$	T_1	T_2	$\frac{T_1}{T_2}$	Coeff. of Friction (f)	Slip, % (s)
15.1	375	409	199	304	105	2.89	0.38	0.77
19.4	391	425	256	341	84	4.06	0.50	1.04
23.8	410	444	314	379	65	5.83	0.65	1.34
26.7	430	464	352	408	56	7.29	0.73	1.53
29.5	447	481	389	435	46	9.45	0.85	1.72
32.0	477	511	422	467	44	10.6	0.89	1.92
34.8	504	538	459	499	39	12.8	0.98	2.12
37.5	540	574	495	535	39	13.7	1.00	2.33
39.0	555	589	515	552	37	14.9	1.04	2.49
41.9	590	624	553	589	35	16.8	1.10	2.85

The tension shown by the testing machine, or the pull on the journal, was

$$(T_1 - T_c) + (T_2 - T_c) = T_1 + T_2 - 2T_c = 375 \text{ lb.}$$

If the belt had been running slowly, so as to have no appreciable centrifugal tension, the journal pull would have been 34 lb. more, or 409 lb. This is the sum of the actual tensions in the two strands of the belt, or $T_1 + T_2$.

Knowing the power and speed, we can calculate the difference in tensions $(T_1 - T_2)$, and also the separate tensions in the two strands, which are T_1 and T_2 . Thus, while transmitting 15.1 hp., this belt had a tension on the tight side of 304 lb., and on the slack side of 105 lb., as shown in the first line of the table.

$T_1 - T_2$ is the traction of the belt on the pulley, and is proportional to the power transmitted. These tensions are also shown graphically in Fig. 2, plotted from the data in the table.

The ratio of the tight to the slack tension, T_1/T_2 , can have almost any value. When there is no load, $T_1 = T_2$, so that $T_1/T_2 = 1$. As the load increases, the ratio T_1/T_2 increases and may reach a very large value. Each value of T_1/T_2 corresponds to a definite value of the coefficient of friction. This coefficient of friction is calculated from the ratio of the tensions by means of the formula $(T_1 - T_c)/(T_2 - T_c) = f a \times \log e = 0.4343 f a$, in which f is the coefficient of friction, and a the arc of contact in radians.

The largest value of T_1/T_2 which we have so far obtained is about 70/1, corresponding to a coefficient of friction of 1.35.

In the table, the coefficient of friction and slip are both given, and it will be noticed that both increase with the load. This is shown graphically in Fig. 3. Evidently the increase in coefficient of friction is caused by the increased slip, since there is no other factor which is changing enough to account for it. After about 44 hp., in this test, the friction no longer

*Both of J. E. Rhoads & Sons.

increases, and may even diminish. This may be near the point at which true slip begins. If so, it would indicate that the change in friction is due to creep rather than slip.

Fig. 4 shows the way in which the coefficient of friction increases as the slip (or creep) increases.

This property of leather belting, which gives an increase in its pulling power as the slip increases, is a most interesting and valuable one, whose significance was been appreciated for only a short time. It is this property which gives to leather belting, which has been properly tanned and curried, its wonderful capacity

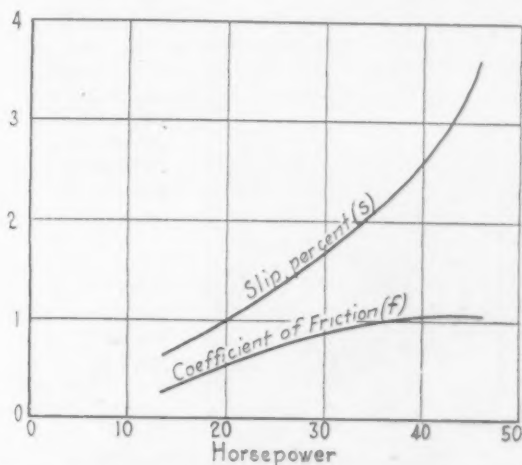


Fig. 3—Showing How Both Slip Percentage and Coefficient of Friction Increase With the Power Transmitted—the Former at a Highly Accelerating Rate

for carrying enormous overloads above the normal rating. With the best belts this reaches a point well over 100 per cent of its normally rated capacity.

In this connection, within the last few years, improved methods of tanning and currying adopted by the most progressive manufacturers have resulted in its being possible for a properly made leather belt to be rated for ordinary purposes at a materially higher figure than was generally considered safe a few years back. These improvements, chiefly to the surface of the leather, have resulted in conservatively estimating the

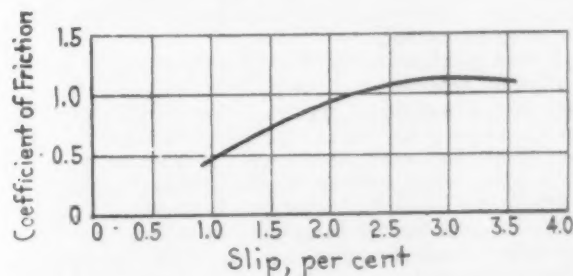


Fig. 4—Increase of Slip With Increasing Frictional Coefficient

capacity of a given leather belt at about one-third more than was general five years ago.

From a power standpoint, the main saving obtained through the use of the best leather belt, as compared with most fabric belts, is that the leather belt can run with a larger proportion of the tension on the bearings doing effective work. There can be less tension upon the slack side of the belt, consequently less waste of energy through bearing friction. On some drives this is a large factor, one which probably would of itself justify investment in the best type of leather belt at a much greater first cost, entirely disregarding the fact that the leather is usually a much longer lived belt.

That railroad traffic is heavier than ever before is shown by the fact that 1,033,130 cars were loaded in the week ended Aug. 4, the largest total, except for the 1,041,044 of the previous week, in our history.

Further Decline in Refractories Shipments in July

Lessening clay fire and silica brick shipments continued in July, according to the monthly report of the Refractories Manufacturers' Association, which shows that shipments of clay fire brick decreased about 3,000,000 9-in. equivalent brick, while the shipments of silica brick were down more than 1,000,000 brick, as compared with June. The fact that the iron and steel industry accounts for the consumption of such a large part of the production of these grades, as disclosed in THE Iron Age, Aug. 16, page 402, and that this industry has been a little sparing both in orders and specification in the past few months explains largely the continued decline in shipments, which, in the final analysis, are the real story of business.

Production of clay fire brick declined even more heavily in July than did shipments. Net new orders showed a slight gain, but stocks on hand July 31 were approximately 2,000,000 brick greater than one month before, while unfilled orders were down almost 10,000,000 from those of June 30. There was a substantial loss (almost 3,000,000) in new orders for silica brick. Stocks July 31 were slightly less than one month before, but unfilled orders dropped almost 4,000,000 brick.

The figures in detail, in 9-in. equivalents, figures in parentheses being the percentages to monthly economical producing capacity, follow:

Clay Fire Brick		
	July	June
Capacity reporting.....	74,591,977	75,341,977
Stock, first of month....	155,573,382 (208)	152,193,088 (201)
Production	56,976,368 (76)	61,165,622 (81)
Shipments	54,607,581 (73)	57,785,328 (76)
Stock, end of month....	157,942,669 (212)	155,575,382 (205)
New orders	45,773,431 (61)	44,875,776 (59)
Cancellations	605,177 (1)	594,102 (1)
Net new business.....	45,168,254 (60)	44,281,584 (58)
Unfilled orders.....	79,926,439 (107)	89,365,766 (118)

Silica Brick		
	July	June
Capacity reporting.....	22,565,500	22,565,500
Stock, first of month....	34,310,226 (152)	34,960,553 (155)
Production	11,980,788 (53)	12,608,422 (56)
Shipments	12,047,202 (53)	13,258,749 (59)
Stock, end of month....	34,243,812 (152)	34,310,226 (152)
New orders	8,351,087 (37)	10,293,682 (46)
Cancellations	556,712 (2)	1,000 (0)
Net new business.....	7,794,357 (35)	10,292,682 (46)
Unfilled orders.....	30,775,050 (136)	34,927,877 (155)

Foundry Production Generally Maintained

Writing of conditions in the foundry trade, Rogers, Brown & Co., Cincinnati, say in their pig iron market letter of Aug. 18:

While foundry melt is lighter than that registered earlier in the year, it is moving along at a good seasonable rate with excellent prospects ahead. The falling off has been most noticeable in the soil pipe shops and those foundries supplying the machine tool industry. Other important lines show continued activity. Cast iron water pipe is in strong demand, while the sanitary ware, radiator and malleable shops in general are pushing their production. Some automobile foundries have had a slight let up, but on the whole they seem to be moving forward confidently and as the new season develops should be running to capacity. The agricultural implement manufacturers find much ground for optimism in spite of propaganda to the contrary and are planning on an active season starting the last of September or first of October.

On the same subject the Matthew Addy Co. says:

Here in the Middle West the consumption of pig iron is keeping up extremely well for this season of the year. Stove shops, automobile manufacturers, makers of malleable castings and steel castings have not shut down as they usually do during the heated term but have been operating straight through the summer.

French Iron and Steel Output This Year

The French production of pig iron for the first half of this year, according to statistics of the Comité des Forges de France, was 2,298,808 metric tons, of which 27,930 tons was made in electric furnaces.

The steel output for the same half year was 2,183,765 tons, of which 2,129,953 tons was ingots. The output by processes was: Bessemer, 1,263,206 tons; open-hearth, 891,424 tons; crucible, 6826 tons, and electric 22,309 tons.

Power Operated Ring-Wheel Grinder

A new ring-wheel grinder, incorporating, among other features, power-operated lever tables, has been placed on the market by the Badger Tool Co., Beloit, Wis.

The machine shown in the accompanying illustration carries two 24-in. wide face abrasive wheels and two power-operated lever tables. This arrangement of the work table is intended to permit one man to operate both ends of the machine, one fixture being loaded while the work in the other is being ground. In addition to saving the labor of one operator, the arrangement is intended also to eliminate the heavy labor of feeding-in and rocking the work back and forth across the face of the wheel.

The wheel dressers are mounted at the rear side of the machine as shown, being placed so that they will not interfere with the grinding operation, and are at all times ready for use. Provision is made for aligning the dresser slides in true relation to the machine spindle.

Power for rocking the work tables is transmitted by belt from the machine countershaft to a reduction gear box on the rear of the machine. Rocking motion is imparted to the work tables by the two straight levers shown. The work is held against the grinding wheel by adjustable spring tension through the hand lever on the work table.

In operating the machine the table rocking lever is disconnected, the hand lever grasped and the work table drawn slightly back from the grinding wheel, the table being rocked forward at the same time until it is clear of the grinding wheel. The piece to be ground is placed in the fixture and the table is swung back into the grinding position where the table rocking lever engages and rocks the work slowly back and forth across the face of the wheel. The adjustable spring tension supplies the necessary in-feed, leaving the operator free to repeat the operations outlined at the opposite end of the machine, while work is being ground by one of the wheels.

The machine illustrated is equipped with fixtures for grinding the tops and bottoms of electric iron sole plates. The fixtures are of the floating type, which permit the castings to locate themselves against the face of the wheels in order that only a minimum amount of stock need be removed to clean up the castings.

The weight of the machine, fully equipped, is approximately 3100 lb.

Cast Iron Pipe for Enameling Purposes

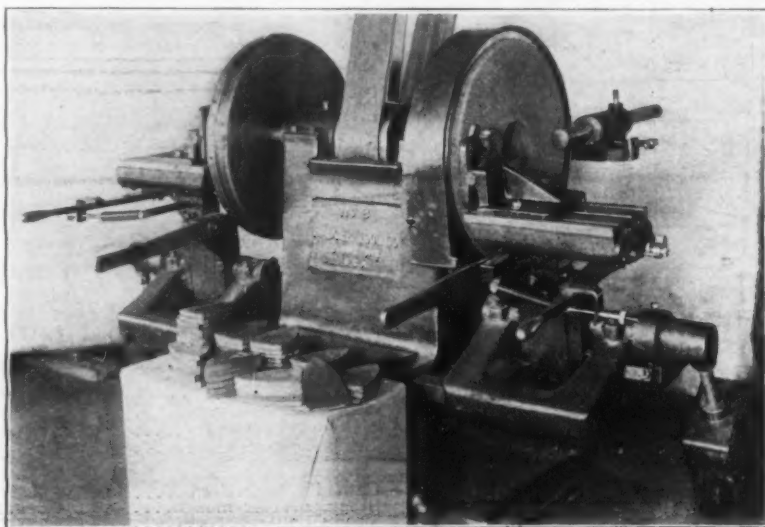
The Bureau of Standards has received a number of specimens of typical enameling castings, and these are now being enameled with several commercial cast iron enamels. The chemical analysis of the castings has been made, and the Bureau also plans to make up typical bodies of cast iron in its metallurgical division. The specimens thus obtained will also be analyzed chemically and enameled. An attempt will be made to correlate the blistering of the enamel and the chemical composition of the cast iron, with the object of obtaining a good commercial cast iron which will not produce blisters.

Manganese Losses in Washin Caucasian Ores

Wasteful methods in the washing of manganese ores, produced in the Kutais district in the Caucasus, are depriving the world of enormous supplies of material, according to a statement made today to the Institute of Politics, meeting at Williams College, Williamstown, Mass., by C. E. Julihn, representing the Department of the Interior. Such waste is of international interest, Mr. Julihn emphasizes, because of the relatively small reserves of high grade manganese known to exist and the importance of such ores in the manufacture of steel.

A study of the preparation of the Kutais ores, made by J. W. Furness, associate mining engineer of the Bureau of Mines, develops the fact that the tremendous wastes now occurring are due to the desire to meet an

unreasonable and unnecessary trade requirement calling for manganese of 52 per cent grade. An annual production of approximately a million tons of ore containing 52 per cent manganese is made from the Kutais deposits by washing ore which averages 47 per cent of the original manganese. This means in effect that, in order to make an improvement of 5 per cent in grade, about one-half the manganese mined is lost in washing.



Ring Wheel Grinder Equipped with Power Operated Lever Tables. One man operates both ends of the machine

The Bureau of Mines investigation developed that about 20 per cent of the production from these deposits is marketed in the United States, 40 per cent in Great Britain, and the remainder in France, Germany and Italy. To these countries, which are the great steel producers, the conservation of high-grade manganese is especially important.

It was pointed out by Mr. Julihn that there are no established international agencies authorized to consider such unwarranted wastes of the world's precious natural resources. The consumers, he declared, are most concerned with obtaining the highest possible grade of material without thought or responsibility as to the future of world industry. It is hoped that the calling of attention to these serious manganese losses may lead to some means of remedying the situation and thereby establish a precedent for the correction of other unsound international trade practices.

Portland Cement Production

July output of Portland cement reported by the United States Geological Survey amounted to 12,620,000 bbl., compared with 12,382,000 bbl. in June and 12,910,000 bbl. in May. These three months showed the greatest production of any three months in the history of the industry.

Shipments in July at 13,712,000 bbl. were higher than in June, but lower than in May. No month's shipments this year have reached the high figure established in August, 1922, at 14,361,000 bbl.

Spring Meeting of Electrochemical Society

The annual spring meeting of the American Electrochemical Society will be held at Philadelphia, April 24, 25 and 26. Two symposia definitely decided upon for that meeting are "Organic Electrochemistry" and "Recent Progress in Electrolytic Refining."

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ESTABLISHED 1855

THE IRON AGE

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Merchantable Bar or Scrap?

Statistics on the production of electric furnace steels and alloy steels are often quoted to measure the startling growth of the "quality" idea in the steel trade. Without denying that specifications are becoming more rigid, it must be remembered that a steel is not necessarily good because it comes out of an electric furnace or contains a little alloy. A more significant sign of the pressure which purchasers are bringing to bear may lie, therefore, in the fact that producers of tonnage steels are giving serious study to ways and means whereby the percentage of scrap may be reduced, and whereby a greater part of the metal cast into ingots may be worked into products that will stand severe punishment in subsequent manufacturing operations.

It is a very complex problem, this problem of sound steel, really *sound* steel. The traditional expedient of tool makers is not available—to melt cleanest raw materials and at leisure. Nowadays a pile of miscellaneous scrap and cheap pig iron must be converted into steel by tons instead of pounds.

Nevertheless it is by no means hopeless. More and more evidence is accumulating that defective steels are generally dirty steels. The converse also appears to hold: the same troublesome steel will produce a better and better bar, both as to external and internal soundness, as the ingot is less segregated and contains fewer non-metallic inclusions, both solid and gaseous.

The inquisitive heat-treater and metallographist has furnished much of the evidence indicating a relationship between soundness and cleanliness; but the metallurgist in the steel plant naturally must rely upon his own brains and skill to keep these inclusions to the economical minimum. He in turn is confronted by such problems as: "What is this dirt, anyway?" "Is it a product of an essential steel-making reaction?" "Can it be entirely eliminated under any circumstances?" "What is the safe limit for my product?"—things about which the wisest know very little.

Fortunately he can draw upon the lore of the crucible melter, verified completely by experience with artillery steels from the open-hearth and

supported by principle holding throughout the science of metallurgy: Fine steel must be killed in the furnace. Everyone knows that the wildest metal can be quieted by additions to the ladle and even to the mold. Little thought is needed, however, to realize that there is small chance for the tiny particles of slag and bubbles of gas resulting from the reaction to be washed out of the metal. Such steel, made in the ladle, is dirty and subject to defects of greater or less seriousness, first cousin to the flakes, laminations and woody structure which kept munition makers awake at night.

It may be said that some of the above propositions are debatable. Granted. But there is such a wealth of collateral evidence from practice and such a mass of theoretical considerations supporting the main conclusions—namely, that cleaner steel will produce less scrap, and that cleanest steel must be deoxidized in the furnace—that more than one plant in trouble has turned to the expedient of operating awhile with these principles in view. The worst that could happen would be a longer heat, but that is not so important. A smaller number of good ingots that can be sold is much to be preferred to a greater number headed straight for the scrap pile!

The Farmer's Automobile

A statement recently attributed to the Department of Public Works of Nebraska was that the farmers of that State would incur this year an expense of \$135,000,000 for running their automobiles, while the value of their wheat and corn, their principal crops, would be only \$88,000,000. We have seen some grave editorial comments respecting this, but none saying: "Impossible; it couldn't be done."

This is another warning not to accept such statements without critical analysis, not even when they are fathered by a Government body. In this instance the cost of automobiling to the farmer is obviously overestimated, and there is no intimation that the value of his other produce may greatly exceed that of his wheat and corn. Nevertheless, the situation with respect to this uplift in the scale of living is sufficiently serious.

Let us take the nearby State of Minnesota, which lately reflected its discontent by rejecting the regular Republican candidate in a senatorial election. The crops of that State this year are expected to realize about \$500,000,000, but in truth the total will be less than that, for the corn and hay, valued at about \$125,000,000, will be used mainly at home in raising livestock, dairy and poultry products, etc.; so that eliminating these duplications the actual yield of Minnesota's agriculture this year may be about \$400,000,000.

Minnesota has about 180,000 farmers. In the neighboring States the percentage of farmers who own automobiles ranges from 85 to 95. If we conjecture only 83 1/3 per cent for Minnesota the number operated by farmers in that State will be 150,000 (out of the total registry of 340,000 passenger cars in 1922). At an average operating cost of \$500 per annum (the Nebraska Department of Public Works says \$553) the cost to the Minnesota farmers would be about \$75,000,000. Of course this estimate for cost is for direct operation, with no allowance for depreciation.

The \$400,000,000 worth of products is gross realization, not net. Out of it comes cost of supplies, hired labor, taxes, upkeep, etc. The taking of \$75,000,000 for automobiling out of such a gross is rather staggering at first sight; or, for that matter, at second sight. Either the Minnesota farmer is doing better than his complaints indicate or he is doing too much automobiling. There is probably something in both ideas.

The Governor of South Dakota recently made a bid for popularity by effecting an uneconomic reduction in the price for gasoline. So simple was his expedient that the crusade spread like wildfire, and even Mayor Hylan thought of winning such easy glory if newspaper reports were correct. Yet if these governors had the welfare of their people really at heart they should have prayed for higher gasoline, not lower.

Folly of the War Bonus

Bonus payments to the men who went to war, or adjusted compensation, as more euphoniously phrased, would have to be provided from taxes paid by the American people, either individually or through industry. Since the level of taxes is such as to form already a severe handicap to industry on the one hand, and on the other an incentive to the purchase of tax-free bonds, it is hard to look with equanimity upon pending efforts to force a bonus bill through Congress.

Careful analysis by the National Industrial Conference Board indicates that such legislation would call for approximately \$4,000,000,000. This would represent a tax of some \$175 upon every family in the land. Much of this tax would be derived from industry, causing a rise in the price of manufactured commodities and increasing the cost of living. This would not only nullify in large extent the benefits which those receiving the bonus could expect from it, but add heavily to the burdens of everybody else. A further rise in prices (cost of living) might be expected to follow the sudden demand for "consumption

goods," caused by the rapid expenditure of the sums received.

To what extent this added taxation would force industries to curtail operations is purely speculative. Whatever unemployment this might cause, however, would add a further bad effect to the fiscal elements already outlined. Another point made by the investigating board that well may be taken into account, is that the bonus would seriously hamper the Government in caring for disabled veterans or in meeting the increasing demands that will be made upon it for pensions.

Steel for the Oil Industry

Steel manufacturers have never shown much disposition to forecast the demand for steel in the oil industry by the position of oil itself, and the practical experience of the past few months justifies their reserve in this matter.

Three or four months ago, when declines in crude oil prices began to attract attention, predictions were not uncommon that drilling would be largely arrested, and that accordingly the steel industry would have a much lighter demand from the oil trade. There is, perhaps, one of those cases that so often arise, of cause and effect being confused. The tendency to drill may be the cause of excessive production, instead of excessive production removing the tendency to drill. It is not necessarily the case, in other words, that oil is produced for the direct purpose of marketing it as soon as produced. The condition in many fields is as a matter of fact a different one. The actual attitude of the producer is that he wants to get the oil out of the ground before some one else gets that oil. This is the situation in the majority of the newer fields, and it is the newer fields that furnish the chief demand for steel.

Complication arises from the fact that the oil industry uses steel in four large ways, apart from many minor uses, and these four ways are totally distinct. They are not only distinct, but some of the uses tend to vary inversely with each other.

While there is a term "oil country goods" the term includes two distinct classes of material, tubular goods used at oil wells and line pipe used in transporting oil. A third large use of steel in connection with oil is in tanks for oil storage. A fourth is in tin cans for exporting oil.

In large measure the drilling of wells, as intimated above, may depend upon local conditions in the field rather than upon demand for oil. Surplus production may or may not restrict the drilling of wells. However, it usually does increase the demand for storage tanks, and frequently a large amount of steel goes into that use. Again, other things being equal, abstention from the laying of pipe lines may cause demand for tanks to arise. Then a line may be laid and the tanks are not needed. Finally, if the domestic demand for oil decreases more oil is exported, and that causes demand for tin plate. Any large export movement of oil will produce a heavy demand for tin plate. A general rule is that the less the demand for oil the more the demand for tin plate from the oil industry.

There is no other steel consuming industry

that presents these peculiarities and complications. Other industries call for more or less steel from time to time according as they are more or less prosperous or active.

To illustrate the divergences, in recent weeks the oil industry has been calling for a fair though a slightly decreased tonnage of oil country tubular goods, apart from line pipe, has been buying practically no line pipe, has been buying storage tanks in spurts and has been inquiring about tin plate. Not much tin plate actually has been bought, as the mills cannot furnish early deliveries, but later in the year there is likely to be a large movement in oil plate. Mills have not entirely finished their line pipe orders, booked months ago, and a fresh buying movement may develop soon in that direction.

Railroads Functioning Well

Freight car loadings in the week ended July 28 were the greatest for any week in the history of American railroading, and loadings in the following week, while showing a slight decrease, were otherwise the largest, yielding only to the preceding week. The numbers were 1,041,044 cars and 1,033,130 cars respectively. Car loadings are a prompt and ready index to the volume of freight movement, but are, of course, not as accurate as the ton-mileage, the figures for which are belated, and less useful only on that account. The ton-mileage in May was 39.6 billion, the greatest for any May, the May record having previously been held by the 38.6 billion of May, 1917.

It is one thing, of course, for the railroads to break their records and another thing for them to furnish the service desired of them. In addition to record loadings the railroads have been showing car surpluses, there being a net surplus of 60,000 cars at last report. They also have cars coming to them, having had 86,716 new freight cars on order on Aug. 1, with deliveries being made steadily.

Early in the year there were numerous predictions that before this time the railroads would become congested and would not be able to render the service required by shippers. These predictions have failed entirely of verification. The peak load always comes in October. According to records of recent years this may be 5 or 10 per cent above the present traffic. Some authorities mention 15 or 20 per cent as a possible increase, but the idea in such estimates may be to stimulate the railroads to prepare very fully. They have done very well in recent weeks in car and locomotive repairs and still have much rolling stock to be repaired and returned to service, so that their prospect is good.

This excellent functioning of the railroads would naturally be expected to discourage efforts at hostile legislation in the forthcoming session of Congress. It has appeared, however, that the legislators or prospective legislators who have busied themselves, chiefly on the platform, with railroad matters, are in reality enemies of the railroads rather than friends of good service. They seem to wish to tear down rather than to build up.

COKE LUXEMBURG'S PROBLEM

Ruhr Receipts at Low Ebb and Stocks Declining—Only 25 Blast Furnaces Operating

LUXEMBURG, Aug. 4.—During July, improvement in the Luxemburg iron and steel industry has been continuous, but there is still a pessimistic attitude in some quarters. Inquiry has been more active and prices have increased slightly, but this has been an insufficient compensation for the sacrifices resulting from the depreciation of the Belgian franc. Regular arrivals of coke are not sufficient to meet the actual requirements of the works, and stocks, which had been greatly increased by shipments received from Great Britain and America, are decreasing again. It is felt that there is no hope of receiving further supplies from the Ruhr for some time; on the contrary, the complete exhaustion of stocks is feared before the ovens can be put on blast again and no tonnage of any size is expected from Belgium. As heavy buying of foreign coke, at actual cost of the dollar, sterling and florin, is unprofitable in view of the quality of such fuel, which suffers by successive transshipment, the Luxemburg iron and steel industry once more faces complete stoppage of industrial activity.

Offers, f.o.b. Antwerp, are now more numerous and prices are maintained in contrast with Belgian and Lorraine quotations. Casting pig iron No. 3 is quoted at 455 to 460 fr.; basic ordinary pig iron, 450 fr., delivered to Belgian railroad stations; basic ingots, 550 fr.; blooms, 575 fr.; billets, 625 fr.; large, 640 to 650 fr., and bars, 750 to 760 fr. or a little higher than the Belgian product, which is sold f.o.b. Antwerp at 730 to 750 fr. (Belgian currency). Large beams are quoted at 740 fr.; small beams, 725 fr. Heavy plates are £8; heavy sheets, 750 to 770 fr.; hoops, 925 fr., and wire rods, 1,000 fr., f.o.b. Antwerp.

Number of Luxemburg Furnaces in Blast in July		
	Number in Blast	Total Furnaces
Arbed:		
Esch	5	6
Dudange	3	6
Dommeldange	1	3
Terres Rouges:		
Belval	4	6
Hadir:		
Differdange	6	10
Rodange	3	5
Steinfurt	3	3

The total pig-iron production of Luxemburg furnaces in June was 89,785 metric tons, of which 86,860 tons was basic grade. The total steel ingot production was 74,351 metric tons, of which 72,419 tons was basic material, 1160 tons open-hearth and 322 tons electric furnace.

COMING MEETINGS

August

American Institute of Mining and Metallurgical Engineers. Aug. 20 to 30. Quebec and other places in Canada. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

Lake Superior Mining Institute. Aug. 29, 30 and 31. Twenty-third annual meeting, Hotel Spalding, Duluth, Minn. A. J. Yungbluth, secretary.

September

Chemical Industries. Sept. 17 to 22. National exposition, Grand Central Palace, New York.

Machine Tool Exhibition. Sept. 18 to 21. Mason Laboratory, Yale University, New Haven. New Haven branch, American Society of Mechanical Engineers, 400 Temple Street, New Haven, Conn., in charge.

Association of Iron and Steel Electrical Engineers. Sept. 24 to 28. Convention and exhibition, Broadway Auditorium, Buffalo. J. F. Kelly, 1007 Empire Building, Pittsburgh, secretary.

American Electrochemical Society. Sept. 27 to 29. Annual meeting, Dayton, Ohio. Dr. Colin G. Fink, Columbia University, New York, secretary.

One Mill's Experience with 8-Hour Day

A Leaf From the Book of the Tyler Tube & Pipe Co.—Costs Increased and Efficiency Lessened

BY E. TYLER DAVIS*

I HAVE been reading with interest of late in THE IRON AGE experiences and views in the iron and steel industry on the 8-hr. day, especially as to what the change from 12 to 8 hr. will bring forth. Our plant consists of a forge, rolling mill and tube works. Prior to 1918 only our rolling mill and forge were unionized, and about that time our welding department was unionized. Our rolling mill and forge, although unionized, work under the charging time conditions of the Amalgamated Association, which means a 9 to 10-hr. working day usually in the rolling mill department, and about eight hours of continuous work in our forge department.

Shortly after being unionized our welding department, which prior to that time had operated on the 10 and 12-hr. basis, was changed to the three-shift plan of continuous operation, it being anticipated that an increase in hourly production, and consequently in total production, would take place. In changing our basis of operation at that time hourly rates were advanced to a higher basis than that paid by any mill in the Pittsburgh district, in which we are located, but at that our skilled and semi-skilled welding department employees have not been able to earn as high total daily earnings as in similar departments of other mills where 11 and 12, and 10 and 12-hr. shifts prevail. A factor leading to our trial of three 8-hr. shifts was the local labor situation in this community, which is primarily a glass-making town, an industry to which the 8-hr. day and the three-shift basis are particularly adapted.

Plan Attracts Less Efficient Workers

The following conditions sooner or later became apparent as we operated under the three-shift plan:

1. Short hours attract less efficient workers. Our daily earnings ceased to attract industrious workers from other tube mills, because of lower daily earnings, but they did attract the less desirable men seeking short hours and the relatively high hourly rates. Furthermore, our industrious labor, more especially the foreign, left us to seek the greater earnings to be had elsewhere, where longer hours obtained.

2. Decreased production. Instead of our total production per furnace hour increasing, and the production per day increasing, it actually decreased on the three 8-hr. turns. For some considerable time it was thought that this was due to less effort upon the part of our men, but close observance of furnace conditions and operations demonstrated to us that roll changes, adjustments, mechanical interruptions, and the ever necessary fixing of bottoms were actually causing from three-quarters to one hour's loss of work on each 8-hr. turn, whereas most of these things on the two-shift basis had been done between turns and at the noon hour. If anything, the loss of production was aggravated by the very interest of the men themselves in going ahead with their work, oftentimes before their bottoms were in a proper condition, which led to defective product and to another stoppage of work. Our experience led us in July of this year to discontinue the third shift, although we still continue to work an actual 8-hr. day.

How Costs Increase

3. No compensating increase of effort—same pace on short as long workday. The men on all positions around our welding furnaces during the summer months

are actually employed on their jobs only one-half of the time they are in the plant; that is, they work 15 minutes and rest 15 minutes. At the time the three-shift 8-hr. basis was adopted with us no concession was made in this matter of spell hands, nor has any yet been made. Scarcity of labor and the efforts of the union have been effective in maintaining crews and working conditions unchanged in face of shorter hours and less real need for spell hands. In other words, practically all the men on our furnaces are actually working at their occupation during the summer months only four hours out of 24, although in the mill eight hours. Even in winter they are all resting not less than one-third of their time spent in the mill. No increased productive effort on the part of our men has been obtained to compensate the company for the increased rates on 8-hr. turns. There is no increase in the number of heats per hour, the pace today being practically the same as when on the long turns.

4. Eight-hr. day increases costs even if rates were unchanged. On the three 8-hr. shifts there was a great increase in the number of non-productive man hours due to the necessity of paying the full crew for stoppages of work, such as mentioned under paragraph two above. At these times only part of the crew was employed, and in addition to the actual labor costs for the full crew there was no compensating production.

On the two-shift basis, whether actual 8-hr. shifts or 10 and 12-hr. shifts, practically all the payment for this lost time is avoided, as the roll changes, making of bottoms, etc., is done at noon hour and between turns, and only the men actually employed are paid for this work. While the two 8-hr. shifts eliminate the excessive labor cost for lost time, we nevertheless have the increased idle machine and equipment time of the plant due to its being idle so many more hours in 24 than it would be on either the continuous operating basis or the two long shifts, and the consequent increase of overhead and fixed charges because of this circumstance. The inevitable non-productive man hours on three 8-hr. turns of continuous operation, or its alternative of increased idle plant time on two 8-hr. shifts, lead in either instance to an increase in cost as compared with the two long shifts.

More at Stake Than Wages and Hours

Having pointed out some of our experiences, and being every day concerned with the problem of bringing back our working conditions that they may compare favorably with those in other mills, I am convinced that no general plan of work day can apply successfully to all branches of the iron and steel industry, and that much more is at stake than the mere matter of wages and hours. Appreciating that union relationships possibly may complicate matters, nevertheless I am convinced that merely shortening the hours of labor will not change the pace of a man, and that in making these changes it must be considered whether man power or machine is the controlling factor.

No one would welcome the return of the 12-hr. turn, where it has departed, and eventually it will disappear from American industry. On the other hand, where physical effort governs the rate of production, increased effort must be put forth by the worker on the short turn, either directly or by sacrificing some of the rest periods now enjoyed. Labor must give this effort, which it is not now giving, or production per man will suffer and branches of the industry depending upon physical effort will decline. Four hours of actual labor in 24, our present condition, is not a fair day's work

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for the worker, and eventually would be eliminative in competitive industry for the employer unless it universally obtained.

I have submitted the above to you, believing that

at least part of it will prove useful if it only serves to bring home the thought that concessions are much more easily given than withdrawn and that it is much easier to maintain advantages than to regain them.

Progress in Short Work Day Chiefly at Blast Furnaces

PITTSBURGH, Aug. 20.—Elimination of the 12-hr. day in the steel industry still is largely a Steel Corporation effort, as outside of Youngstown few of the independent companies here or in nearby districts yet have passed beyond the consideration of plans for the change. While the shorter workday is being set up in Steel Corporation plants as rapidly as possible, it has been for the most part concentrated on the blast furnace departments. When the corporation has completed the movement in that direction it will move on to the open-hearth and Bessemer steel departments and then to the coke plants.

It is quite evident that full establishment of the shorter day is not going to be easily accomplished, for already there are some signs of dissatisfaction among the men, which is not confined entirely to those who will lose income as a result of the change. Men employed in the departments of noncontinuous operations, whose hours of labor and compensation are not disturbed under the plan outlined by the American Iron and Steel Institute committee, here and there are inclined to object because they are getting no more for a 10-hr. day than those employed in the continuously operated departments receive for 8 hr. The fact that independent companies in some localities where there are plants of the Steel Corporation are not doing much toward making the change tends to hold back the efforts of the latter to some extent, since it is a pretty general condition that most men would prefer to work the longer turn for the greater compensation and will go to the plants where this is possible. It is necessary, therefore, for the Steel Corporation subsidiary companies to move with caution to avoid losing too many of their men. These are a few of the many problems which the transition involves.

National Tube Co. Retains 6-Day Week

The Carnegie Steel Co., as noted in THE IRON AGE of Aug. 16, began the abolishment of the 12-hr. day last

Thursday by setting up three 8-hr. shifts at its blast furnaces. On the same day, other subsidiaries of the Steel Corporation also made a start. The National Tube Co. already has all four of its blast furnaces at McKeesport, Pa., on three 8-hr. shifts, and has gone over in part to that arrangement at its Riverside works, Benwood, W. Va., and Lorain, Ohio, works. Its plan for the application of the change is somewhat different from that of the Carnegie Steel Co. The latter is along the lines indicated in a special report in THE IRON AGE, Aug. 16, page 399, which in brief provides for a 32-hr. layoff for the men every six weeks, but does not entirely eliminate the 7-day week. The National Tube Co. plan calls for seven turns of eight hours each week, with every man taking a layoff of 24 hr. in every seven days, thus preserving a 6-day week. Since this company still is concentrating on reducing the hours of labor at its blast furnaces, it is too soon to say anything as to the number of extra men that will be needed in rounding out all continuous departments to the new working schedules.

The American Sheet & Tin Plate Co. has started to put its workmen, not already on the short workday, on the new schedules. This involves only a small percentage of the total, since the 8-hr. day for years has been the workday for tin mill men. Crane operators, millwrights, power house men are the principal classes of help affected at all plants, excepting only that at Vandergrift, Pa., where the company maintains its only steel works.

The efforts of the American Steel & Wire Co. also are directed for the present toward getting the blast furnaces on a three 8-hr. shift basis. Many of the men employed around the furnaces of this company have been on the work for as long as 30 years and do not welcome the change, which means a smaller envelope each semi-monthly pay, and means closer watching of their expenditures and probably a change in their modes of living.

Youngstown Adjustments in Connection with the Shorter Day

YOUNGSTOWN, Aug. 21.—Some labor troubles marked the initial steps in the Mahoning Valley to eliminate the 12-hr. shift in blast furnace, open-hearth and by-product coke oven departments. Much of the friction was due to misunderstanding on the part of the workmen and largely had been ironed out, for the time being, by the first of the week. The tube mill department of the Republic Iron & Steel Co. was affected for a time. First reports indicated that there had been some trouble at the plants of the Youngstown Sheet & Tube Co. and the Carnegie Steel Co. While many of the men in both of the latter two plants expressed dissatisfaction over the methods of the change and the rates of pay, nevertheless there was no walkout and little suspension of operation.

At the Republic Iron & Steel Co.'s plant, upward of 1000 men were at first affected. There was no assemblage of the workmen and no disorder of any kind. Details of workmen called on the management and discussed grievances and ways and means of effecting satisfactory adjustments. Most of the men agreed to remain in their places until details of the change are more fully worked out.

In the case of the Youngstown Sheet & Tube Co. the efficacy of the employees' representation plan was demonstrated. Anticipating that misunderstandings would arise, and that some inequalities would remain to be worked out, the management previously had consulted with employees, through their chosen representatives, in round-table discussions. In fact, the change

had been frequently discussed, and the men had been told in advance that whatever inequalities might exist at the start would be adjusted later.

One independent employer in this district still had on Aug. 16 about 38 per cent of its workmen on the 12-hr. turn. This company during the past few years had been abolishing the long day gradually and hoped to continue this process. During the summer, over 400 workmen, largely men in the open-hearth department, and the higher priced employees, including many tonnage men, had gone on an 8-hr. basis. Many of them had asked for the change. As a general rule, the foreign-born workmen prefer the longer work-day, and the Americans the shorter day, if they receive a comfortable wage which will enable them to live according to the American standard.

What the men will do with the additional idle time suddenly thrust upon them is a question mill operators have had under advisement and consideration for some time, but as yet have not devised plans that can be regarded as a solution of the problem. The men, especially the foreigners, will be encouraged to attend day and night schools as far as possible, to congregate at Y. M. C. A.'s and at other points where the environment is wholesome. Another plan which is being encouraged in the Mahoning Valley is for the men to purchase small plots of ground, and raise garden produce. This plan is meeting with some favor, but naturally little can be done with it until next season.

There appears to be an ample supply of workmen

available for the three-shift plan, so far as it has been introduced. Many men who heretofore have done odd jobs in the mills have applied for steady positions under the short day. Recent blast furnace suspensions in the district have also provided a good many workmen.

Reduced Operation in Mahoning Valley

YOUNGSTOWN, Aug. 21.—The principal change in operating schedules of Mahoning Valley iron and steel properties this week is in reduction of active blast furnace and sheet mill capacity.

The Youngstown Sheet & Tube Co. has suspended both of its stacks in the Hubbard group, while No. 3 blast furnace in the Haselton battery of the Republic Iron & Steel Co. has been blown out for relining and repairs, which work will start at once. Of the 66 open-hearth furnaces in the Valley, including both Steel Corporation and independent units, 56 are operating.

Of sheet mills but 78 of 117 mills were scheduled at the beginning of the week. At its East Youngstown plant, the Sheet & Tube company is operating but 8 mills, as compared with 15 the previous week, while the Mahoning Valley Steel Co. at Niles, is operating but four mills, half of its complement, comparing with six active units the week before. The active sheet mills in the Valley are divided as follows: Sheet & Tube, 20; Newton Steel Co., 17; Trumbull Steel Co., 15; Republic Iron & Steel Co., 8; Sharon Steel Hoop Co., 7; Falcon Steel Co., 7, and Mahoning Valley Steel Co., 4.

The A. M. Byers Co., Pittsburgh, is operating 72 of its 88 puddling furnaces at the Girard works, and one skelp mill, in addition to its blast furnace. Its puddle mill operation is somewhat larger than usual and progressive improvement from now on is anticipated. Slackening of sheet mill activity has diverted men to the puddle mills, heretofore retarded by lack of labor supply.

The Trumbull Steel Co., at Warren, Ohio, is operating close to capacity, with 24 tin mills scheduled this week, 14 at the Trumbull plant and 10 at the Liberty works, 13 sheet mills and two jobbing mills, a total of 39, of 44 units in all. The blast furnace, seven open-hearth furnaces and all of the company's strip mills are active.

Rate on Iron and Steel Products to Pacific Coast to Be Lowered

The next supplement to the transcontinental all-rail freight tariffs on iron and steel products, it is reported, will establish a rate on these products from Pittsburgh to the Pacific Coast of \$1.15 per 100 lb. This compares with the published through rate of \$1.50 and the combination of the Pittsburgh to Chicago and the Chicago to the Pacific Coast rates, which results in a rate of \$1.34. The latter rate is now in common use and is permissible under Article 4 of the tariff. The date the new rate becomes effective is not yet known, but when it does it will result in a reduction to intermediate points in the far western tier of States, which otherwise would have higher rates than to the Pacific Coast proper.

Steel Furniture Stock Business in July

WASHINGTON, Aug. 21.—Shipments of steel furniture stock goods in July by 22 manufacturers amounted to \$1,247,605 as against \$1,401,950 in June and \$945,768 in July, 1922, according to the Bureau of Census. The following table gives comparative figures for the first seven months of 1923 and 1922:

	1923	1922
January	\$1,362,470	\$983,834
February	1,307,173	967,125
March	1,709,206	1,087,228
April	1,520,286	1,058,382
May	1,506,072	1,056,735
June	1,401,950	1,015,463
July	1,247,605	945,768

Tariff Commission Investigation of Pig Iron Costs

WASHINGTON, Aug. 21.—The field investigation by the metals division of the Tariff Commission of pig iron production costs in the United States has been completed. This work was taken up through the application of Eastern merchant blast furnace interests for an increase in the import duty of 75c. per ton on pig iron under the flexible provisions of the Fordney-McCumber act. The agents of the commission, acting under Paul M. Tyler, chief of the division, through questionnaires and personal investigation, visited virtually all of the merchant furnaces in the various sections of the country. They will now compile the data obtained and later it is expected to make an investigation in pig iron producing countries of Europe. In the event authority for the trip abroad is granted by the commission it is proposed that the work be done by Mr. Tyler, F. M. Leonard, an iron and steel expert of the division, and two accountants. The unsettled conditions in Europe make it uncertain when the trip abroad will be made but it is hoped that it will be sometime this fall.

Revised Extras on Rivets Show Average Advance of \$5 a Ton

The Pittsburgh Screw & Bolt Co. has issued a revised list of rivet extras which will become effective Sept. 1, and will apply on all orders and contracts after that date. It is stated that these new extras are to take the advances recently made by all steel manufacturers on their standard bar card extras.

An innovation in connection with the new list is that after Sept. 1 there will be only one base price on rivets, instead of two base prices, one on structural rivets and one on boiler rivets, as has been the custom in the past. Structural rivets in the future will be base, and when boiler rivets are specified, an extra of 20c. per 100 lb. will apply.

The company is also preparing new list prices on machine, carriage, blank and tapped bolts, lag screws, nuts, etc. The new steel bar extras also are the occasion for this revision, which becomes effective on Sept. 1.

The new list of base sizes and extras on rivets, which shows an average increase of about \$5 per ton will probably be adopted by makers generally, as follows for button-head structural rivets:

Base Sizes

$\frac{3}{4}$ in., $\frac{7}{8}$ in., $1\frac{1}{4}$ in. diameter.
Longer than 2 in. up and including $2\frac{1}{2}$ in. packed in kegs or bags weighing 200 lb. or more.

Standard Extras

$\frac{1}{2}$ in. diameter.....	\$0.75
$\frac{5}{8}$ in. diameter.....	.35
$\frac{3}{4}$ in., $\frac{7}{8}$ in., $1\frac{1}{4}$ in., and $1\frac{1}{2}$ in. subject to the same diameter extra as nearest smaller diameter, plus 25c. net per 100 lb.	
Rivets larger than $1\frac{1}{4}$ in. diameter.....	\$0.25
Lengths 1 in. and shorter.....	.75
Lengths longer than 1 in. up to and including 2 in....	.25
Lengths 5 in. and longer.....	.50
Swell necks .....	.25
Annealing rivets for cold driving.....	.50
Rivets packed in 100 to 199 lb. packages.....	.40
Reinforcing kegs or packing in bags for export—25c. net extra per package.	
Packing in boxes for export, price on application.	
Cone or button head boiler and tank rivets.....	\$0.20
Steel head rivets.....	.45
Countersunk head rivets.....	.45
Bull head rivets.....	.70
Pan head rivets .....	.45
Special shape or sized heads other than style and standard above listed, price on application.	
We prefer not to break kegs, but where necessary to ship less than 100 lb. of a size, \$1 net extra will be added for each broken keg.	
Cost of testing and inspection, if any, to be at customer's expense.	

The Associated Employers of Indianapolis are sending out a monthly digest of labor conditions in Indianapolis to the members of the association. The digest will also contain a review of labor conditions throughout the United States.

EUROPEAN FOUNDRY SITUATION

Survey of the Conditions in England and Western Europe

The following information bearing on the opportunities for the sale of American foundry machinery and equipment in England and parts of western Europe has been received from the representative of an American manufacturer now in Europe:

England—The foundry business in England is at a very low ebb—in fact, is as bad if not worse than at any time since the war. I spent the last week of July in England and found the managers of the English foundries now rather optimistic, feeling that the crisis had been passed and a pickup in the foundry industry likely. The Belgian foundrymen with their exchange handicap have been able to underbid English steel foundries to such an extent that they are now making the bulk of the steel castings purchased in England. However, I do not feel this will last very long.

France—The foundry business in France is much better than in England, but the sale of American equipment is very slow on account of the recent wild fluctuation of the franc. We find it impossible to sell

American machines under such conditions. The low exchange rate does not so much affect the sale of American machinery as the fluctuation. When the exchange becomes stabilized for a certain length of time, say two or three months, with a variation of possibly 1 or 2 per cent, the manufacturers start to purchase, but under a fluctuation of 10 or 15 per cent within two or three days' time, they are always fearful of results and hold off from buying.

Belgium—Foundrymen seem to be fairly busy and while they are not buying much machinery due to the high cost of the dollar, nevertheless they are turning out more steel castings than any other country in Europe. In fact, we have sold more equipment in Belgium in the past three or four months than in any other country in Europe.

Switzerland—The foundries in Switzerland are not very busy. They are in the same position regarding their sale of goods as the Americans. The Switzerland franc is nearly at par, and the high cost of production limits their markets. Very little factory equipment has been purchased in Switzerland in the past two years.

Italy—The foundry business in Italy has been at a low ebb since 1920; in fact, we have done no business whatever in Italy since that time. While optimistic as to the future, they hesitate to commit themselves.

GERMAN PRICES ON POUND BASIS

Effort Made to Stop Depreciation—Dullness in Unoccupied Area—Fewer Bankruptcies as Mark Declines

BERLIN, GERMANY, Aug. 6.—The policy of the Reichsbank of rationing foreign currency allotted for import purposes and fixing the exchange rate has largely been responsible for the extensive scarcity of some foodstuffs. Coal prices have been increased again, about 143 per cent in the occupied districts and about 125 per cent in other parts of the country, effective Aug. 2. This new price includes for the first time a depreciation factor to allow for the difference in exchange on the day of delivery and the receipt of payment at the mining companies.

In order to insure revenue the railroads intend introducing non-depreciating prices for freight rates and fares on Sept. 1. The railway charges are to be altered in accordance with an index taking into account wages and the prices of coal, iron, etc. This arrangement is expected to introduce a new, unstable factor into the calculation of prices of goods. The wholesale price index has advanced 131 per cent to 183,510 times pre-war prices. Despite this tremendous rise, the prices have not gone up proportionate to the decline of the mark. The last official cost of living index on July 30 is given at 71,476 times the pre-war.

Iron and Steel Prices Stabilized

The Eisenwirtschaftsbund (Iron Trade Association) has issued the new pig-iron prices for the first half of August which are calculated on the basis of 5,000,000 marks to the pound sterling. Prices are to vary with the exchange and payment is to be made according to the last official exchange before the day of payment. Base prices for Siegerland pig-iron are not definite yet, as prices on the raw material have not been fixed. They are given at 18,988,000 m. for steel-making iron and 19,654,000 m. for spiegeleisen of 8 to 10 per cent manganese, both subject to change. Contrary to the practice on other grades, these prices are not determined in relation to the exchange, but bills have to be paid in a shorter time and to partially protect the works against depreciation half of the probable amount of the bill has to be paid in advance. On payments in foreign exchange a rebate of 2 per cent is granted and interest is paid on advance payments in exchange. Hematite blown in with German fuel is quoted at 26,250,000 m. per metric ton; blown in with imported fuel at 28,750,000 m. Foundry iron No. 1 is 30,000 m. cheaper, foundry iron No. 3 3000 m. cheaper and Luxemburg quality 10,000 m. cheaper.

The occupation is not only hampering the iron and

steel industry in the occupied area, but is affecting other parts of the country. The Siegerland iron industry is still well-employed in pig-iron, sheets and bar iron. Business in the engineering industry is, however, quiet on domestic as well as foreign account. Supplies of raw material and fuel have been inadequate lately. In sheets and tin plate manufacturers are finding it difficult to compete abroad. As a result of the stoppage of supplies to the Rheinische Westfalian districts the Siegerland ore mines are unable to dispose of their production and have to pile a large part of it.

New Guiding Prices Fixed for Steel

The steel combine has fixed works base prices for the first half of August at the rate of 5,000,000 m. to the pound sterling. There is no differential now between the prices of basic and open-hearth material. The following table gives the guiding prices in marks per metric ton:

Guiding Prices

	Bessemer and O.-H. Aug. 5	O.-H. Material July 28
Ingots	31,968,000	14,175,000
Blooms	36,532,000	16,175,000
Billets	38,991,000	17,262,000
Sheet bars	40,481,000	17,911,000
Shapes	46,085,000	20,156,000
Iron bars	46,250,000	20,250,000
Hoop iron	57,637,000	25,001,000
Wire rods	49,008,000	21,473,000
*Sheets:		
No. 6 and heavier...	52,124,000	22,371,000
Nos. 6 to 11.....	58,236,000	25,394,000
Nos. 11 to 20.....	69,255,000	29,861,000
Nos. 20 and lighter..	77,102,000	32,877,000

*United States Standard Gage.

The Reichswirtschaftsminister (Minister for Economic Affairs) in June threatened to take action against firms refusing delivery of imported goods or those partly made of foreign material unless the customer agreed to bear the loss resulting from the rationing of foreign exchange.

Increase in Mergers and Decrease in Bankruptcies

The Linke-Hoffmann-Lauchhammer Co. is negotiating with the Wilhelmschütte Co. engineering works, and foundry at Eulau, near Sprottau, for an Interessengemeinschaft. The Wilhelmschütte is manufacturing machines, wooden and sheet iron products and castings. The Eulau works produce boilers, mining machinery and pumps, and has lately been engaged in locomotive repairs for the state railroads. The Ober-Salzbrunn plant of the company manufactures lifting and transport appliances. The company employs 1500 men.

With every downward movement of the mark the number of bankruptcies is decreasing and only 17 insolvencies were declared during July against 35 in June and 78 in July, 1922.

Conference Relations Aid to the Short Day

Chances for Promotions as Men Are Trained for Responsible Places on the Third Shift—Merchant Blast Furnaces Waiting

BY BRADLEY STOUGHTON

THE experience of the past week in changing from the 12-hr. day at iron and steel works has proved to be very much easier in those plants which have a closer personal contact and communication with their men. As forecast in the previous article, a change made summarily could not avoid some minor injustices and inequalities of treatment, or at least dissatisfaction because of apparent inequalities. At one plant there was actually a walkout of some of the men, but this was soon settled by negotiation and conference. In this incident the situation was greatly helped by the fact that an employees' representative system was in vogue at the plant, which had established mutual confidence and good will and which afforded the machinery for quickly smoothing over the difficulty. Instances of this kind can scarcely be avoided, but can be quickly ironed out when the men are made to understand that any injustice will be rectified as soon as possible. The important desideratum is to maintain contact with the men and to retain their confidence and good will. Without some degree of mutual concessions and cooperation the change can scarcely be made.

Undoubtedly one of the most important considerations in this will be the policy adopted by almost all the plants which have some system of employee representation, namely, taking the men fully into the confidence of the management on the one hand, and on the other rigorously avoiding any discrimination because of the acts of the employees' representatives or because of things expressed by them in their representative capacity. It has proved in several cases to be difficult to secure frankness of discussion on the part of the employees, without considerable encouragement.

Getting an Understanding with Employees

One plant which has been conspicuous in its operation of the two-shift system for a period of years, and which also maintains a system of employee representation, supplements this by a still further system of keeping in personal communication with its employees: First, by a series of weekly letters which are of interest and attractive in character, but not necessarily having anything to do with the company's business or with the relations of the company and its men. These letters are attached to bulletin boards which are situated at all the gates. The purpose of the letter is merely to attract attention, and on the boards are also notices posted by the men themselves. I noticed, for example, several notices of "Bording Houses," "Hound pups for sale." By establishing the bulletin board as a point of interest in this way, the company then uses it for any message it wishes to get across to the employees. The second method is the house organ of the company, which is published every month and is sent to each of the several thousand employees at their homes. Third is a series of circulars, often accompanied by a letter from the vice-president and works manager of the company, sent to a selected list of about 500 employees, including all superintendents and all foremen and all members of the employee representative group.

Finally, and this seems to be the most important item for establishing close relations and mutual confidence, are the meetings of the foremen held in the

company's auditorium approximately once a month. In these meetings the vice-president talks to the men very frankly regarding the company's business, the general industrial situation in the country, the condition of orders on the books, cost of production, the meaning of stock dividends, the importance of satisfying the stockholders as well as the workmen, the meaning and importance of reserve, etc. On one occasion, when the situation seemed to demand it for maintaining a basis of complete confidence, a selected number of employees from one of the mass meetings were taken in to examine the books of the company. If the company has made a mistake in any of its dealings with the men no attempt is made to try to cover this up, but it is acknowledged frankly in the "foremen's forum." Important lessons are taught in this forum, such as the importance of waste or loss through defective material, how little wealth each individual would get if all the world's capital were divided. The experience is that the men do not always understand, but they quickly sense a false note or appreciate a frank and sincere discussion of policies, and they are satisfied if they believe the management is doing the best it can for their interests.

In changing from the 12-hr. day one difficulty is sure to arise, namely, the disposition of some of the men to avoid making their best efforts and endeavoring when possible to create a necessity for extra hours of employment. It has been said that this would be particularly noticeable where an added rate of compensation is paid for overtime. On the other hand, it has been found in at least one case to help the situation greatly when the gang whose turn it is to work daylight hours on Sunday, or on certain of the holidays such as Christmas and the Fourth of July, receives pay at time and a half rate.

Chances for Promotions

The recent change whereby men who have been working 12 hr. are reduced to 8 hr., with an increase of 25 per cent on the hourly rate, involves a reduction in daily wage, except that a large additional number of skilled laborers are going to be required to work the three-shift system and these extra men will be promoted from lower positions. Thus, some second helpers will become first helpers and some of the better class of laborers will be promoted to positions of skill. These promotions will all involve an increase in the hourly rate over and above the 25 per cent increase. In the case of men who are reduced from the 12-hr. work to 10-hr. work without increase of hourly rate, and men who were working 10 hr. before and after the change and have no increase in rate, they may be encouraged by the prospect of promotion due to the larger number of higher priced jobs available. They can also anticipate a possible reduction to 8 hr. labor at the same daily wage as a promotion when deserved. There will undoubtedly be a great deal of labor working two turns of 10 hr. each. This will include not only the millwrights, electricians, repair men and common laborers, but also many rolling mill crews. In a great many plants the rolling mill capacity, if worked continuously, is greater than the steel making capacity. If, therefore, there is sufficient soaking pit capacity

to act as a reservoir, two 10-hr. turns in the rolling mills, with 2-hr. periods at either end for repairs and adjustments, for change of rolls, etc., will become very common practice.

If Demand Revives

The change from the 12-hr. day is made possible at this time through the circumstance of a slight falling off in the demand for product. If the autumn brings an increased demand, securing sufficient labor to operate three shifts may at that time occasion real difficulties. It is of the utmost importance that the extra crews needed should be trained as soon as possible and that changes in equipment, general overhauling and tuning up of the apparatus to respond to the more intensive operation on the three-shift system, the discovery and elimination of bottlenecks, the installation of modernized equipment and of labor-saving devices, should begin as soon as possible. Undoubtedly this is going to call for a good deal of capital expenditure and it is very probable that some plants, and especially some merchant blast furnaces, may be hard pressed by competition. This is especially the case at blast furnaces and open-hearth furnaces which are still lacking in such common labor-saving devices as oxygen for opening the tap holes (including both blast furnaces and open-hearth furnaces), mud guns for closing them, mechanical devices for recarburizing in the open-hearth ladle, electrical operation of open-hearth doors, etc. Long runners into slag and metal buggies at blast furnaces are a source of a great deal of waste of labor owing to the care of skulls, and this is often the fault of the original furnace design and cannot be remedied without costly tearing down or excavating. So much has been accomplished in the way of improvement in design, equipment, labor-saving devices and operation by the technical staff during the past ten years, especially at blast furnaces and

open-hearth furnaces, that we can look forward with justified optimism to what may be accomplished as soon as it is realized what a great saving of labor will result if and when the peak loads can be lightened by mechanical devices or by adjustment of conditions so as to produce greater regularity.

Consider the peak load which comes five times a day at the blast furnace and two to three times a day at every open-hearth furnace. The actual amount of man-hours represented by the upper third of this peak is very small, indeed, but it nevertheless represents in cost-saving one third of the total labor bill of the skilled men on the furnace. This point is discussed in more detail in Chapter 19 of "The Twelve Hour Shift in Industry" (New York, 1922). If the open-hearth operation could be so well controlled that the furnaces would tap within approximately regular time intervals, it might be possible to make great savings by carrying the peak load of all the furnaces by an extra gang, which would go a long way toward paying the total cost of the change at the furnaces to three shifts. The ingenuity and initiative for which American technical men and executives are famous may very probably solve this and many other like questions when necessity becomes the mother of invention.

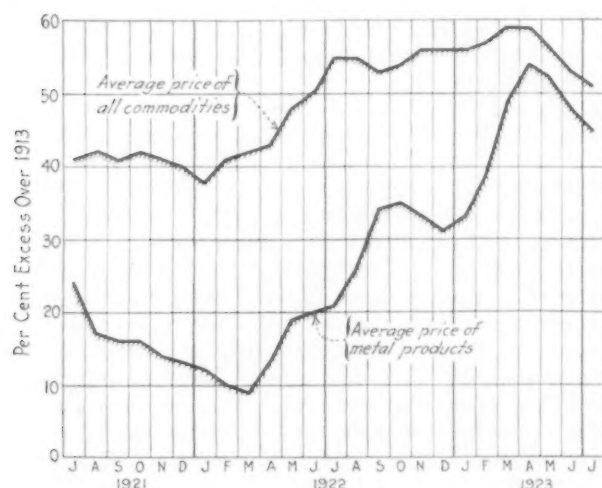
Merchant Furnaces Not Yet Changing

Thus far there has been no change to three shifts on the part of any merchant blast furnaces. Such furnaces will be called on to deal with the matter, however, where they are in the same locality with steel company blast furnaces that are changing over. Buffalo is an example, and there are similar situations in the Cleveland and Chicago districts. At Buffalo the producing companies have been in conference to devise means by which in due time all blast furnace employees will be working under the three-shift plan.

WHOLESALE COMMODITY PRICES

July Figures Fall Below June—Cost of Living Increases

Figures of the Bureau of Labor Statistics indicate that the index number of wholesale prices in July was 151, compared with 100 for 1913. This is two points



As Shown in the Chart, Prices of Metals Have Been Below the General Level of Prices Continuously, for More Than Two Years

lower than the 153 in June and four points lower than the 155 of July, 1922. Declines occurred in every item of the list except for house furnishings, which were

stationary at 187—the third largest item recorded, being exceeded only by building materials and by clothing.

Metals and metal products at 145, compared with 148 in June, were prices well below the general average, as has been the case constantly during the past two years. Comparative figures are given in the table and shown graphically in the diagram.

Cost of Living

Figures of the National Industrial Conference Board for July show the cost of living, based on the workmen's budget, at 61.9 per cent above the figure for July, 1914, compared with 60.1 per cent excess in June.

Food, rent and clothing all increased, while there was a slight decrease in fuel and lighting. These figures have shown comparatively little change in the past two years and more, the highest percentage of excess over 1914 having been 64.8 in September, 1921, while the lowest was 54.5 in August, 1922. There has been a fairly steady rise since last February, but its amount has been small.

Index Numbers of Wholesale Prices, by Groups of Commodities

	1920 Peak	1922 July	1923 May	1923 June	1923 July
Farm products.....	247	135	139	138	135
Foods	248	142	144	142	141
Cloths and clothing.....	346	180	201	198	193
Fuel and lighting.....	281	254	190	186	183
Metals and metal products..	203	121	152	148	145
Building materials.....	300	170	202	194	190
Chemicals and drugs.....	213	121	134	131	128
Housefurnishings	275	173	187	187	187
Miscellaneous	208	114	125	123	121
All commodities	247	155	156	153	151

Scrap Metal from Discarded Warships

Estimate of 322,000 Tons of Steel Plates, Shapes and
Armor from Twenty Battleships and Battle Cruisers
—Four Ships to Be Used as Targets

WASHINGTON, Aug. 21.—Upon the signing last week of the Four-power Treaty for the Limitation of Armaments, Acting Secretary of the Navy Theodore Roosevelt announced that the Navy will start at once to scrap all ships coming under that treaty. They include 24 vessels. Of these seven are battleships under construction and four are battle cruisers under construction, while 13 are old vessels long ago completed. Of these vessels the battleship Washington, which is of the latest type of construction, and the old battleships South Carolina, Virginia and New Jersey likely be sunk as the result of experiments and tests. Because of this, these vessels are eliminated from calculation of the scrap that might be recovered. It is estimated that the scrap in these vessels totals 63,500 tons, of which 27,600 tons is credited to the Washington, and 12,000 tons each to the three others.

Calculated on the percentage of their completion, it was estimated that the ships under construction would involve 203,500 tons of scrap, while those completed will involve 118,470 tons, making a total of 321,970 tons of steel, exclusive of machinery. The estimate of non-ferrous metal from all 20 vessels to be scrapped is 11,000 tons.

The vessels to be scrapped, exclusive of those to be subjected to tests, and the scrap tonnage involved, are shown in the following table:

Ships	Average Percentage of Completion	Probable Tons of Scrap
Indiana, South Dakota, Montana, North Carolina, Massachusetts, Iowa (battleships).....	29	117,500
Constitution, United States, Constellation, Ranger (battle cruisers)	16	86,000
Michigan, New Hampshire, Kansas, Vermont, Minnesota, Connecticut, Louisiana, Rhode Island, Nebraska, Georgia (old battleships)	100	118,470

Plans for getting bids for the old ships and other methods of disposing of them were officially announced by Mr. Roosevelt as follows:

The Navy Department has adopted three different methods in dealing with the problem. They cover in brief the three situations with which it is confronted: First, ships under construction at private yards; second, ships under construction at navy yards; third, older ships already built.

In the case of vessels building at private yards, the builders have been requested to submit estimates for

(a) The purchase of the ship on the stocks "as is," to be cut up into scrap sizes at their own expense.

(b) For the cutting up of the ships into scrap sizes, in order that the Navy may sell them as scrap.

(c) A total figure for the complete and final settlement of all claims in connection with the construction, the cancellation of contract, and the scrapping of the vessels, the scrapped material to remain the property of the ship builders.

Vessels building at navy yards will be advertised for sale in the near future, the proposals to invite bids as follows:

(a) For ships in present condition on the stocks, to be cut up into scrap sizes and removed by purchaser.

(b) For the scrap material cut up into scrap sizes by the Navy.

Ships already built, the older vessels out of commission at Navy yards, will be sold under terms somewhat similar to those governing the sale of battleships heretofore sold, such as the Maine, Missouri, Ohio and Kentucky.

The terms of sale in the case of vessels to be scrapped will be slightly different from terms of previous sales of vessels. The Department will require:

(a) The removal of certain material which can be used to advantage by the Navy.

(b) That the vessels be scrapped within a specific time.

(c) That the vessels will be sold only to citizens of the United States.

(d) That the purchaser give adequate bond that the terms of sale will be carried out.

In case the vessels that are to be the object of experiments and tests are not sunk, they will be disposed of by sale for scrapping within the time limit provided by the treaty. No action is being taken at present for the disposition of the battleships Delaware and North Dakota, now abroad on the midshipmen's practice cruise, as the treaty does not require that these vessels be scrapped until the Colorado and West Virginia are placed in commission, the ceremony being scheduled for Sept. 1 and Oct. 15, respectively. It is the present intention of the Government to dispose of the Delaware by sale for scrapping and to convert the North Dakota into a target ship. It is estimated that the Delaware will net about 15,000 tons of scrap.

Of the eleven ships under construction which are to be scrapped, the Iowa and South Dakota were being built at the New York Navy Yard; the Montana at the Mare Island Navy Yard, Cal.; the North Carolina at the Norfolk Navy Yard; the Massachusetts at the Bethlehem Shipbuilding Corporation, Quincy, Mass.; the Iowa at the Newport News Shipbuilding Co., Newport News, Va.; and the Washington, New York Shipbuilding Corporation, Camden, N. J.; the Constitution and United States at Philadelphia Navy Yard and the Constellation and the Ranger at Newport News.

The table shows the gross tons of ferrous and non-ferrous materials and machinery estimated to be in each of the 10 old battleships to be salvaged and the average weight of ferrous metals in each of these old vessels. The average of the newer types of ships and cruisers runs somewhat higher:

	Average Weight in Tons	Percentage of Total Weight of 13,830 Tons
Ferrous Materials		
Plates, shapes, bolts, rivets.....	5,948	43.01
S.T.S. or nickel steel plates.....	377	2.73
Piping and tubing.....	124	0.90
Casting	945	6.83
Forgings	830	6.00
Armor	3,623	26.19
Total ferrous materials.....	11,847	85.66
Non-ferrous metals		
Composition castings.....	342	2.47
Brass pipe and tubes.....	69	0.50
Copper pipe, tubes and wiring...	68	0.49
Lead, babbitt and zinc.....	12	0.09
Copper and brass plate.....	14	0.10
	505	3.65
Machinery		
Generators		71.36
Pumps		37.69
Blower engines.....		12.8
Fans, reversible engines and ice machines.....		8.88
Secondary and auxiliary batteries and miscellaneous..		262.32
Motors for turret turning gears and for turret ammunition and hoist and torpedo launching tube fittings		26.95
		420

The Chemical exposition will not be held in 1924, according to a recent vote taken among the exhibitors by the management. The results of a mail vote on the question of whether the exposition should be held every year or every other year ended on July 28 and showed about 60 per cent of exhibitors voting were in favor of a biennial exposition. The vote by mail was taken by the management as a result of the meeting of exhibitors held at the Chemists' Club, New York, on July 28, at which time a vote on the question by those present resulted in a tie. It was then decided that all exhibitors should vote again by mail and that this should be considered the final decision in the matter. Following the 1923 Chemical exposition, which will be held during the week of Sept. 17 to 22 at the Grand Central Palace, New York, the next exposition will be held in 1925 by the same management.

Iron and Steel Markets

MORE RAILS FOR 1924

**Total Already Placed for Next Year,
350,000 Tons**

A Good Week in Structural Steel—Turn in Pig Iron Still Awaited

Rail buying is the main point of interest in a market that has not yet given definite advance signs of fall activity. At Chicago four western roads have just closed for a total of 68,000 tons for 1924, following the extension of the \$43 price to cover deliveries in the first half of next year. Inquiries for 40,000 tons more are pending. The total of rails already placed for 1924 is put at 350,000 tons, and it is estimated that contracts yet to come will reach twice that figure.

It is too early to know what the car buying program will be. Some roads will place orders this fall, but others, particularly grain carriers, have little to offer. Western carbuilders have orders that will carry them into November and some of them will require fall orders to avoid curtailment. Purchases of 1300 cars and contracting for underframes and for general repairs made the past week the best in two months in the equipment field.

The change to the short day at Central Western works is not yet a market factor, though it is expected to be a stabilizer, in view of added costs and somewhat lessened output. The new regime has increased the uncertainties of the outlook. While buyers concede that it tends to sustain prices, the policy of many of them is still to avoid forward contracting.

The adjustment of output to demand continues, and in the Pittsburgh and Youngstown districts six blast furnaces went out in the past week. In some cases these shutdowns have furnished men for the new third shift. Labor supply on the whole has been greater than was expected, but as yet only a beginning has been made.

In structural steel the week was outstanding in both sales and inquiries. Of 16,000 tons bought, one-third was for railroads and nearly one-third each for public service work and for industrial companies. Inquiries exceeded 32,000 tons, with nearly one-half for public institutions, including 8800 tons for schoolhouses, chiefly in New York. The one-half for private enterprises included 4500 tons for a club house in Chicago and 5600 tons for factories.

The volume of business in July, 125,000 tons, was substantially as large as that in June, and two-thirds as large as the average for the first half of the year.

The weakness in sheets in the past two months is not surprising in the light of sales of but 92,000 tons in July by the independent mills reporting. This is the smallest tonnage, in relation to capacity, since January, 1922, being 80,000 tons less than for June and 150,000 tons less than for May. Shipments in July were 100,000 tons more than sales

and unfilled orders at the opening of August were 263,000 tons.

Wire mills have an average of 30 days' business ahead, but as the leading interest is sold considerably farther than that, some independent companies can make very prompt deliveries. Revival of agricultural buying is still distant.

Tin plate mills will carry over into the fourth quarter large deliveries scheduled for the third. The Texas Co. is in the market for 75,000 boxes of oil can sizes for December-February shipment.

Irregularity continues in bolts, nuts and rivets, in spite of the new list prices effective Sept. 1 that take account of the higher extras on steel bars.

Pig iron markets have not yet shown any real strength, but one or two weak spots have disappeared. The tendency of producers is to hold present quotations more firmly, but it is possible that further tests of the market are to come because of the excess of production over demand. Selling is more active in the Central West than in the East, particularly at Cleveland, where 20,000 tons has been sold. Sales of Valley basic iron totaling 2500 tons have apparently established the market at \$25, furnace, after the cleaning up of iron from second hands that had sold down to \$24 and \$24.50.

Old material shows a firmer tendency in the East that is not yet discernible in the West and is having closer watching for its influence on pig iron.

The Bethlehem Steel Co. has the order for 11,000 tons of rails, with splice bars, for the Imperial Government Railways in Japan. Tin plates for Japan are also an item in recent export business, 40,000 boxes going to a Wheeling mill and 20,000 boxes to a British maker.

For the fifth successive week, THE IRON AGE finished steel composite price stands at 2.775c. per lb., after remaining for eleven weeks at 2.789c. One year ago it was 2.412c.

THE IRON AGE composite price of pig iron this week is \$25.29, or 25c. above last week's. The change is entirely in steelmaking iron, foundry iron having not yet made the turn.

Pittsburgh

Waiting the Market Effect of Short Workday —Basic Iron Firmer

PITTSBURGH, Aug. 21.—The steel situation reflects a slightly more cheerful feeling. It is due less to a material expansion in demand, although there has been some quickening of buyer interest, than it is to the expectation of increased producing costs incident to the abolishment of the 12-hr. day and of solidified prices around current levels. If the application of the shorter day means some reduction in productive capacity and a stabilized market, it is believed buying will be freer than it has been. As yet the prospect has been productive only of a better inquiry and no very marked increase in the size of individual purchases. Buyers are not convinced that higher prices are ahead and

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
No. 2X, Philadelphia...	\$25.76	\$25.76	\$26.56	\$33.14
No. 2, Valley furnace†...	25.00	25.00	25.00	33.00
No. 2, Southern, Cin'ti†...	27.55	27.55	29.05	24.05
No. 2, Birmingham, Ala.†	24.00	24.00	25.00	20.00
No. 2 foundry, Chicago*	27.00	27.00	27.50	30.00
Basic, del'd, eastern Pa...	25.00	25.00	25.50	28.64
Basic, Valley furnace...	25.00	24.50	25.00	26.00
Valley Bessemer, del. P'gh	28.26	28.26	28.26	31.76
Malleable, Chicago*	27.00	27.00	27.50	30.00
Malleable, Valley	24.50	24.50	24.50	31.50
Gray forge, Pittsburgh...	25.76	25.76	26.26	34.76
L. S. charcoal, Chicago...	32.15	32.15	32.15	34.65
Ferromanganese, furnace...	117.50	117.50	117.50	67.50

Rails, Billets, etc., Per Gross Ton:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
O.-h. rails, heavy, at mill.	\$43.00	\$43.00	\$43.00	\$40.00
Bess. billets, Pittsburgh...	42.50	42.50	42.50	37.50
O.-h. billets, Pittsburgh...	42.50	42.50	42.50	37.50
O.-h. sheet bars, P'gh...	42.50	42.50	42.50	37.50
Forging billets, base, P'gh	47.50	47.50	47.50	43.00
O.-h. billets, Phila...	47.67	47.67	47.67	42.67
Wire rods, Pittsburgh...	51.00	51.00	51.00	45.00
Skelp, gr. steel, P'gh, lb...	2.40	2.40	2.40	2.00
Light rails at mill...	2.25	2.25	2.25	1.90

Finished Iron and Steel, Per Lb. to Large Buyers:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Iron bars, Philadelphia...	2.67	2.67	2.67	2.325
Iron bars, Chicago...	2.40	2.40	2.50	2.15
Steel bars, Pittsburgh...	2.40	2.40	2.40	2.00
Steel bars, Chicago...	2.60	2.60	2.60	2.35
Steel bars, New York...	2.74	2.74	2.74	2.34
Tank plates, Pittsburgh...	2.50	2.50	2.50	2.00
Tank plates, Chicago...	2.80	2.80	2.80	2.20
Tank plates, New York...	2.84	2.84	2.84	2.34
Beams, Pittsburgh	2.50	2.50	2.50	2.00
Beams, Chicago	2.70	2.70	2.70	2.35
Beams, New York	2.84	2.84	2.84	2.34
Steel hoops, Pittsburgh...	3.15	3.15	3.15	2.75

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Sheets, black, No. 28, P'gh	3.75	3.75	3.75	3.35
Sheets, galv., No. 28, P'gh	5.00	5.00	5.00	4.35
Sheets, blue an'd, 9 & 10	3.00	3.00	3.00	2.50
Wire nails, Pittsburgh...	3.00	3.00	3.00	2.60
Plain wire, Pittsburgh...	2.75	2.75	2.75	2.35
Barbed wire, galv., P'gh...	3.80	3.80	3.80	3.15
Tin plate, 100-lb. box, P'gh	\$5.50	\$5.50	\$5.50	\$4.75

Old Material, Per Gross Ton:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Carwheels, Chicago	\$19.50	\$19.50	\$20.50	\$21.00
Carwheels, Philadelphia...	20.00	20.00	20.00	19.00
Heavy steel scrap, P'gh...	18.00	18.00	17.00	18.25
Heavy steel scrap, Phila...	16.00	16.00	16.00	15.50
Heavy steel scrap, Ch'go...	16.00	16.00	17.00	16.00
No. 1 cast, Pittsburgh...	21.50	21.50	20.50	19.00
No. 1 cast, Philadelphia...	20.00	20.00	20.00	19.00
No. 1 cast, Ch'go (net ton)	17.50	17.50	18.50	19.50
No. 1 RR. wrot., Phila...	18.00	18.00	18.00	18.50
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.50	15.25

Coke, Connellsville, Per Net Ton at Oven:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Furnace coke, prompt...	\$4.50	\$4.50	\$4.50	\$12.00
Foundry coke, prompt...	5.50	5.25	5.25	13.00

Metals—

Per Lb. to Large Buyers:	Aug. 21, 1923	Aug. 14, 1923	July 24, 1923	Aug. 22, 1922
Lake copper, New York...	14.25	14.50	15.00	14.12½
Electrolytic copper, refinery	13.75	13.87½	14.50	13.75
Zinc, St. Louis	6.45	6.25	6.10	6.22½
Zinc, New York	6.80	6.60	6.45	6.57½
Lead, St. Louis	6.45	6.35	6.10	5.60
Lead, New York	6.70	6.70	6.25	5.90
Tin (Strait), New York...	39.37½	38.50	39.62½	32.50
Antimony (Asiatic), N. Y.	7.62½	7.87½	7.00	5.25

Composite Price Aug. 21, 1923, Finished Steel, 2.775c. Per lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	Aug. 14, 1923, 2.775c. July 24, 1923, 2.775c. Aug. 22, 1922, 2.412c. 10-year pre-war average, 1.689c.
These products constitute 88 per cent of the United States output of finished steel	

Composite Price Aug. 21, 1923, Pig Iron, \$25.29 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Aug. 14, 1923, \$25.04 July 24, 1923, 25.68 Aug. 22, 1922, 26.86 10-year pre-war average, 15.72
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since there is nothing in sight to suggest mills will not be able to make and deliver all the steel that will be required over the remainder of the year, departure from a policy of purchasing in strict accordance with nearby requirements is not discernible.

It is too soon for any of the manufacturers to state definitely what the actual increase in costs attendant upon the new working hours in the departments of continuous operation will be, as the movement is not yet very general and to a degree is still in the experimental stage. The Youngstown Sheet & Tube Co. put down two blast furnaces to insure itself of having sufficient help to maintain operations of its larger units, but in all other instances the change of working hours has been effected without reduction of capacity. This is rather impressive as an influence upon steel consumers in view of the oft-repeated assertion as to the necessity of finding the men to permit of the change.

There is no occasion to make any change in the prices of the major products, because there are few mills that have not enough business to keep them going until the situation has passed to a positive stage as to costs. Price cuts, it is held, would not bring out orders if the material is not wanted. Buyers are taking all the steel due them on old orders without much prompt-

ing, and there are some cases, as in merchant pipe, where they still are exerting much pressure upon the mills for deliveries. This is interpreted to mean sustained consumption, but there is also the factor that invoice prices on much of the tonnage leaving the mills are below those now quoted.

Some increase in the inquiry for pig-iron suggests to producers that the market may be on the verge of larger actual sales and some firming up of prices. The market does seem to be firmer on Valley basic iron, which has sold at \$25, and does not appear to be available at less. The coke market shows a stronger tendency, due to the fact that supplies no longer exceed the demand. Speculative activity in the scrap market seems to have frightened off the consumers, who feel that purchases at this time would only put prices up on themselves.

Pig Iron.—Such sales of basic iron as have been made by Valley furnaces in the past week, and they include one of 1000 tons and another of 1500 tons, have been at \$25 and the claim is made that none of this grade is available at less. A Sharon, Pa., steel company is reported to be seeking 5000 tons of this grade and another melter in the same locality is expected to enter the market soon for at least half that amount.

But this grade still is available outside of the Valley district at a lower equivalent price. A Pittsburgh district melter has a price of \$26.13, which, figured back to a Valley basis, means \$24.37. Bessemer iron still is at \$26.50 at Valley furnaces, but only small tonnages are moving at that price. A sale of 500 tons of malleable iron to a Pittsburgh melter at \$24.50, Valley furnace basis, makes impossible any advance in the minimum price, although most furnaces are asking at least \$1 a ton higher. Foundry iron sales still are being made at prices ranging from \$25 to \$26, Valley furnace, for No. 2, but only small tonnages are involved. There is one 600 ton inquiry for No. 2 for last quarter shipment from a Pittsburgh melter and the Westinghouse Electric & Mfg. Co. wants 250 tons of this grade for its Cleveland plant for September shipment. Some interest is apparent in low phosphorus iron but competition for orders is too keen for prices to show much strength. An Alliance, Ohio, steel foundry recently bought a fair sized tonnage at \$32, Valley furnace. The Bethlehem Steel Co. put down one of its Johnstown furnaces Aug. 16 and the stack of the Clinton Iron & Steel Co. went out of blast the day before. One Republic Iron & Steel Co. furnace and the two Hubbard stacks of the Youngstown Sheet & Tube Co. also were blown out since a week ago. There are now 109 furnaces making iron, 2 banked and 24 idle in this and nearby districts. At the most recent peak 126 furnaces were making iron.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being \$1.76 per gross ton:

Basic	\$25.00
Bessemer	26.50
Gray forge	\$24.50 to 25.50
No. 2 foundry	25.00 to 26.00
No. 3 foundry	24.50 to 25.50
Malleable	24.50 to 25.50
Low phosphorus, copper free....	32.00

Ferroalloys.—Quotations show no change, but there is almost no demand and they represent merely sellers' valuations. It is believed that the appearance of a sizable inquiry for ferromanganese would result in lower prices; indeed, the fact that resale material goes begging and several dollars a ton below the quoted price, is a fair indication of the present market. It is doubted that all producers of 50 per cent ferrosilicon would insist rigidly on \$82.50, delivered, if a chance for a sizable sale was offered. Prices are given on page 513.

Semi-Finished Steel.—There has been no increase in open market activities, but the market is firmer at \$42.50, Pittsburgh or Youngstown, for billets, slabs and sheet bars than it was recently, presumably because it is believed that any excess profits this price permits will be taken up by increased labor costs incident to the abolishment of the 12-hr. day. Interest in forging billets is low and activity in rods is lacking. The latter are firm in price, because production has been reduced to a point more in keeping with actual requirements and few makers have much surplus tonnage to sell. Demand for skelp also is limited. Loss of steel production in this district, as a result of the introduction of the shorter workday, as yet has been negligible. Prices are given on page 513.

Wire Products.—While some makers note greater interest in the market on the part of jobbers, prompted by a desire to be covered in the event that the increased labor costs incident to the introduction of the shorter workday in the steel industry may lead to higher price, the more common condition among manufacturers is that orders, outside of nails and plain wire, are exceedingly light. There is nothing to indicate an immediate revival of demand from the agricultural districts; the farmers are afield and the prices of farm products still relatively too low to suggest much gain in farmer buying power. On an average, producers have about 30 days' capacity business on their books, chiefly nails and plain wire, and at today's operating rate of about 75 per cent are probably stocking a portion of the production. Jobbers' stocks are not so lean as they were earlier in year. There is no pressure for orders, however, with the possibility that the increase in labor costs may be added to present prices. Quotations are given on page 512.

Steel Rails.—Makers of light rails, rolling them from billets or new standard rail crops, although admitting that demand is slow, disclaim any shading of the base price of 2.25c. It is not surprising that business is slow at that figure, with rerolled rails available as low as 1.90c. base, mill, and that price being quoted against rails weighing less than 25 lb. per yd., on which there is an extra on billet rails.

We quote light rails rolled from new steel at 2.25c. base (25-lb. to 45-lb.); those rolled from old rails, 1.90c. to 2c. base (12-lb. to 45-lb.), f.o.b. mill; standard rails, \$43 per gross ton mill, for Bessemer and open-hearth sections.

Tubular Goods.—The fact that buyers still are insisting strongly on the delivery of pipe against old orders, which is taken to indicate a sustained consumption, is the most encouraging feature of the present situation. New orders, particularly of lap-welded pipe, still are running behind shipments with most makers, and because of decreasing order books delivery promises are being steadily shortened. In boiler tubes conditions are much the same as in pipe, with pressure strong for deliveries on old orders, but not much new buying. Discounts are given on page 512.

Cold-Finished Steel Bars and Shafting.—Real activity still is lacking and the firmness of prices still finds its chief explanation in the higher cost of hot-rolled bars rather than in the size of orders or specifications. Makers here are all holding to 3.25c., base, for carloads. Ground shafting holds at 3.65c., base, f.o.b. mill, for carloads.

Hot-Rolled Flats.—Conditions are more favorable to buyers than sellers at the moment. Most makers need business to round out mill schedules and while the regular market price is 3.15c., base, Pittsburgh, as low as 3c. still is being done on strips and less than 3.15c. probably can be done on hoops and bands. Prices are given in full on page 512.

Cold-Rolled Strips.—All makers are on a basis of 5c., base, Pittsburgh, for this product and deviations from that price are few.

Bolts, Nuts and Rivets.—Makers of bolts and nuts are more anxious to sell than buyers are to buy and prices do not show much strength. Bolts have sold below 60 per cent off list for large machine bolts, as against the public quotation of 50, 10 and 10 per cent off list. The fact that new list prices are under compilation, which will recognize the higher extras on steel bars and become effective Sept. 1, does not appear to be stampeding buyers. Rivets have settled pretty generally to \$3 to \$3.10 base, per 100 lb. for large button heads, but even those prices are not minimum with some makers whose order books are slim. Price discounts are given on page 512.

Track Fastenings.—New business in products under this heading is rather slow with manufacturers here, but pressure for orders is not heavy and recent prices hold. They are given on page 512.

Iron and Steel Bars.—Demands still run almost exclusively to small lots for early delivery. Forward buying is lacking, but specifications are said to be free against old orders. There is no change in prices of either steel or iron bars.

We quote soft steel bars, rolled from billets, at 2.40c. base; bars for cold-finishing of screw stock analysis, \$3 per ton over base; reinforcing bars, rolled from billets, 2.40c. base; refined iron bars, 3.25c. base, in carload lots or more f.o.b. Pittsburgh.

Structural Material.—While actual orders to local fabricating shops are few and do not involve large demands upon the mills, inquiries are surprisingly good, and this finds reflection in more numerous requests upon the mills for protection. There has been such firm adherence to quoted prices by the mills that expectations of a drop are not as general as they were recently. Plain material prices are given on page 512.

Plates.—Oil storage tank inquiries are so numerous as to encourage hopes of good sized orders for plates among local makers, but actual orders are not keeping pace with hopes. It has been a quiet week for local and nearby mills in the matter of new business. We

note no important deviations from the regular price. Quotations are given on page 512.

Sheets.—Sentimentally, the market shows some improvement, with buyers showing more interest at least to the extent of trying to find out what the shorter workday in the steel industry is going to mean in connection with future steel and sheet prices. The idea that a decline in price is ahead seems to be disappearing, but at the same time there is no pronounced tendency by buyers to load up at today's quotations. Actual requirements still govern most purchases. It is still possible to buy black sheets at 3.75c., base, but regular quotations on other finishes are well observed. Prices are given on page 512.

Tin Plate.—Cooler weather has resulted in some increase in production, but not to an extent that manufacturers have any hope that they will be able to complete present quarter obligations by the end of the period. There will be a considerable carryover of third quarter tonnage into the succeeding quarter and October shipments will be against late August and September quotas. The Texas Co. is in the market for 75,000 boxes of oil can sizes for December, January and February shipment.

Cut Nails.—Leading makers still are quoting \$3.25, base, per keg, f.o.b. mill, but lower prices are coming out on attractive orders.

Old Material.—Activity of dealers rather than of the mills is the sustaining factor in prices. Recent buyers for consumption have withdrawn from the market and their places have not yet been taken by others. There has been some opening up of consuming points hitherto closed to shipments and this has caused dealers short of material, sold at prices well above those now current, to cover and pay more than consumers would. Dealers are bullish on the market as a general rule, chiefly because they believe the mills have reduced their stocks of scrap and soon must be buyers. There is little change in the prices at which sales into consumption can be made.

We quote for delivery to consumers' mill in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel.....	\$18.00 to \$18.50
No. 1 cast, cupola size.....	21.50 to 22.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	19.00 to 19.50
Compressed sheet steel.....	16.50 to 17.00
Bundles, sheets, sides and ends..	15.00 to 15.50
Railroad knuckles and couplers..	21.50 to 22.00
Railroad coil and leaf springs...	21.50 to 22.00
Low phosphorus bloom and billet ends	23.50 to 24.00
Low phosphorus plate and other material	22.50 to 23.00
Railroad malleable	19.00 to 19.50
Steel car axles.....	21.00 to 21.50
Cast iron wheels.....	19.00 to 19.50
Rolled steel wheels.....	21.50 to 22.00
Machine shop turnings.....	11.75 to 12.25
Sheet bar crops.....	21.00 to 21.50
Heavy steel axle turnings.....	15.00 to 15.50
Short shoveling turnings.....	14.00 to 14.50
Heavy breakable cast.....	18.50 to 19.00
Stove plate	15.00 to 15.50
Cast iron borings	14.00 to 14.50
No. 1 railroad wrought.....	14.00 to 14.50
No. 2 railroad wrought.....	18.00 to 18.50

Coke and Coal.—So evenly balanced is production and consumption of furnace coke that it no longer takes a really big demand to stiffen prices. There have been a few fair sized inquiries for spot tonnages in the past week and buyers have found practically no standard coke available below \$4.75 per net ton at oven, and as high as \$4.90 has been quoted. Negotiations for fourth quarter tonnages have started in a quiet way, but no actual business yet has been consummated; producers are talking \$5.50 for that period, but that is well above what furnace men are willing to go just now. Spot foundry coke also is slightly stronger, in that there no longer seems to be any standard grade available below \$5.50. Increased demand is giving some firmness to coal prices, although the market is not materially higher than a week ago, save on steam coal, which has sold as high as \$2.30 for mine run Pittsburgh vein coal

of the best quality as against \$2.15, the recent maximum. Fairmount steam coal is priced at \$1.75 to \$1.90 and ordinary Pan Handle steam coal at \$2 to \$2.10. Mine run coking coal is at \$2.35 per net ton at mine, and that price also is the going price on gas grade.

Youngstown

Fall Buying Not Yet Manifest—Semi-finished Steel Advance Suggested

YOUNGSTOWN, Aug. 21.—Both steel producers and consumers are watching market developments closely in view of changes predicted to follow the elimination of the 12-hr. day. Sales executives state that business in general this month shows improvement, the orders being more numerous and involving larger tonnages. Fall buying has not yet become manifest, however. There has been recent betterment in the demand for black sheets, though this is not yet reflected in mill operations.

There is a firmer tone to the pig iron market and inquiries for fall delivery are appearing. In this district basic iron is firm at \$25, No. 2 foundry and malleable at \$26 and Bessemer grades at \$26.50. This stabilization of the market follows recent price cutting, when standard basic is reported to have sold below \$24.

There is likewise considerably more firmness in the scrap market, as a number of melters are looking around for fourth quarter requirements. In consequence, prices, which have been weak, show stronger tendencies, and heavy melting steel, lately held at \$18, is now quotable up to \$19. Dealers are buying from the railroads and accumulating stocks against an anticipated heavier demand in the fall.

Inquiry in the sheet market, while improved, is still in moderate volume and lacks the vigor which marked it earlier in the year. While Valley mills claim to be holding to 3.85c. for black sheets, it appears that business has been done at \$2 per ton less, or on a 3.75c. basis. The full finished sheet situation is characterized as satisfactory by the leading district independent interest, though requirements of the automobile industry have appreciably slackened the past month.

In face of an at least temporarily quiet steel market and of the estimated profits per ton on shipments the past six months, it is considered probable that there will be no general steel price advance at this time. Special conditions as affecting certain products such as tin plate, steel plate or merchant steel pipe might force an advance in these lines.

In one quarter it is suggested that there might be an advance on semi-finished steel. In that way competitors of integrated steel makers would be obliged to bear a part of the higher production cost of raw steel, while consumers of finished steel products made by such interests would not be obliged to pay higher prices. Current low fuel costs would appear to operate against an advance on semi-finished steel.

Passing of Control in Ashtabula Sheet Plant

Control of the Ashtabula Steel Co., Ashtabula, Ohio, passed Aug. 18 to the Davey interests of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, following the approval of the stockholders of action previously taken by the board of directors for a disposal of the property. The purchasers include W. H. Davey, president Mansfield company, and several brothers. Owners of 88 per cent of the stock approved the transfer. The plans as adopted provide for the reorganization of the company and the reduction of the present capital stock. It is understood that under the terms the Davey brothers will invest \$300,000 in the new securities of the Ashtabula company. The plant, which has eight hot and two cold mills, was placed in operation in 1922. One of the mills will be rebuilt as a 42-in. jobbing mill and blue annealed sheets will be added to the present products. The plant, for the present at least, will be operated as an independent unit. It will be supplied with sheet bars by the Mansfield company.

Chicago

Broad Buying Not Yet a Fact—Beginnings of 1924 Rail Bookings

CHICAGO, Aug. 21.—The placing of 68,000 tons of rails by four western roads marks the beginning of what is expected to be a generous buying movement following the extension of the present \$43 price to cover deliveries during the first half of 1924. Inquiries for 40,000 tons from western lines are now pending and other carriers are about to enter the market. The Imperial Government Railways of Japan, which were inquiring for 11,000 tons of rails with splice bars, have placed the order with the Bethlehem Steel Co.

Although prospects for rail business are good, there is still some doubt as to the future for car buying. Railroad car builders have unfilled orders which will keep their plants busy until November or December, but unless they get new business soon they will find it difficult to avoid shutting down. Before they commence the execution of new orders they need fully three months to get deliveries of the necessary steel. The attitude of the railroads toward further car purchases is not uniform. Some roads have indicated that they expect to enter the market. Other lines, particularly the grain carriers, complain that their traffic is light. This situation is probably explained by the fact that Federal loans to the farmers have enabled them to hold their crops rather than to market them immediately following harvesting.

There are also some railroads which are waiting for lower prices. The car builders, whose quotations are governed by what they have to pay for materials, especially finished steel, do not look for any material change. They point out that the elimination of the 12-hr. day, now under way, means higher mill costs, and while it is true that the full effect of these added costs will not be felt for some time, owing to the gradual change to the new mode of operation, the trend of costs will be steadily upward in coming months.

The iron and steel market remains quiet, although current bookings of mills are somewhat better than during the exceedingly dull month of July. Buyers continue to purchase small lots for filling in purposes and nothing resembling a broad fall buying movement has made its appearance. All producers are gaining on their obligations, some in greater degree than others. The leading local producer of heavy finished steel, however, is not yet able to offer anything resembling early delivery.

Further progress has been made in the elimination of the 12-hr. day. The Inland Steel Co. has not yet completed the reorganization of its blast furnace department on a three-shift basis, and until that is accomplished will not proceed with the conversion of other departments to the new plan. The Illinois Steel Co. is effecting the change as rapidly as labor supply will permit, but has given out no details as to what departments of its works are now being reorganized. Mill and furnace operations in this district remain unchanged.

Pig Iron.—Although current business is at a better rate than in July, it is apparent that a broad buying movement has not yet developed. Prices, however, are unchanged and local iron in particular is steadier than for some time past. Sellers find encouragement in the fact that a local buyer for plants located throughout the country has put out inquiries for 3500 to 4000 tons. Of this total 1000 tons of malleable iron is for a Chicago district plant, 1000 tons of basic is for an Ohio works, 1000 tons of low phosphorus is for an Eastern seaboard plant and 500 to 1000 tons of 14 to 16 per cent Bessemer ferrosilicon is for various destinations. September to November delivery is desired. In connection with this pending tonnage, trade observers point out that large purchasers generally lead the way in a new buying movement. A Wisconsin melter is in the market for 700 tons of malleable for fourth quarter and a like tonnage for first quarter. A local user has closed for 500 tons of low phosphorus iron, thereby cleaning

up the yard stocks of a producer in this district. There have been a few carload sales of silvery and an inquiry for a car of 10 per cent is still pending. This commodity is firmer owing to the shutting down of a Jackson County furnace and the withdrawal from the market of a hydroelectric maker whose operations are adversely affected by low water. No sales of Southern iron are reported in this district.

Quotations on Northern foundry high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging	
sil. 1.50, delivered at Chicago...	\$32.04 to \$32.15
Northern coke, No. 1, sil. 2.25 to	
2.75	27.50
Northern coke, foundry No. 2, sil.	
1.75 to 2.25	27.00
Malleable, not over 2.25 sil.....	27.00
Basic	27.00
High phosphorus	27.00
Southern No. 2	29.51 to 30.01
Low phos., sil. 1 to 2 per cent,	
copper free	34.00 to 35.00
Silvery, sil. 8 per cent.....	39.29

Ferroalloys.—Producers continue to quote \$117.50, seaboard, on ferromanganese, but resale is available at \$115. A down-State steel works has closed for 100 tons at \$115, f.o.b. New Orleans. Three car lot inquiries for spiegeleisen are in the market, and as low as \$50.80, delivered, has been quoted from one furnace, but no sales at that price have yet been reported.

We quote 80 per cent ferromanganese, \$125.06 to \$125.88 delivered from producers; \$122.50 delivered resale; 50 per cent ferrosilicon, \$88 to \$90, delivered; spiegeleisen, 18 to 22 per cent, \$53.58, delivered.

Coke.—Demand for foundry coke is still limited, although specifications against contracts are liberal. Local by-product foundry remains unchanged at \$13.50, delivered Chicago switching district. Greater firmness in beehive foundry coke is indicated by a sale to a local user of 200 tons for 60 days' delivery at \$5.75, Connelville.

Plates.—An inquiry from the Shell Oil Co. for storage tanks involving 6000 tons of plates has been abandoned and approximately 12,000 tons of additional pending tank work for the California fields is understood to be dormant. The Sinclair Crude Oil Purchasing Co. remains in the market for tanks requiring from 6000 to 14,000 tons. The Illinois Central is inquiring for a car ferry taking 1200 tons. Mill bookings are still comparatively light and progress in the reduction of past obligations continues to be made. The leading local interest, however, is not yet in a position to offer anything approaching early delivery on new business. Prices are steady and unchanged.

The mill quotation is 2.60c. to 2.80c., Chicago. Jobbers quote 3.30c. for plates out of stock.

Cast Iron Pipe.—While demand still lags, pipe shops have not yet caught up sufficiently to offer early deliveries on the smaller sizes. Prices, on the whole, remain firm. Hibbing, Minn., takes bids today on 500 tons of 6 and 8-in. Joy, Ill., will receive tenders tomorrow on 200 tons of 4, 6 and 8-in. Evansville, Ind., receives bids Aug. 24 on 140 tons of 12-in. Detroit is expected to close some time this week for 3264 tons of 6 and 8-in., on which it took bids early this month. Chicago contemplates entering the market for several hundred tons of 6 and 8-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., \$64.20; 6-in. to 12-in., \$60.20; above 12-in., \$57.20 to \$59.20; class A and gas pipe, \$5 extra.

Sheets.—While concessions in black and galvanized continue to be made, they are not yet numerous enough definitely to establish the market on a lower price level. Demand is still very light.

Mill quotations are 3.85c. for No. 28 black, 3c. for No. 10 blue annealed and 5c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote, f.o.b. Chicago, 4.35c. for blue annealed, 5.20c. for black and 6.35c. for galvanized.

Structural Material.—The building industry is showing unexpected buoyancy, although it is to be noted that individual projects are largely small. A large local fabricator quoted on 50 separate jobs during the past week, but the total quantity of steel involved was only 3000 tons. The market is not entirely devoid of sizable tonnages, however. New figures have been asked on ore docks for the Great Northern at Duluth, covering 2300 tons. The award of the Ford Motor Co. plant at St. Paul, requiring 10,000 tons, is expected shortly. An Elks' Club building at San Francisco calls for 1100 tons and a legislative building at Olympia, Wash., will take 1000 tons. Figures have been asked on the Lakeshore Athletic Club building, on the north side of Chicago, which will involve 4500 tons. Fabricating awards are more numerous than for several weeks. Two railroad lettings alone account for 3500 tons. Plain material prices remain unchanged, but fabricators appear to be in no hurry to replenish their stocks.

The mill quotation on plain material is 2.60c. to 2.70c., Chicago. Jobbers quote 3.30c. for plain material out of warehouse.

Bars.—Demand for soft steel bars continues more active than for plates, shapes and sheets, although buying is still largely for filling in purposes. For one large local mill new business booked in bars in the first part of August was nearly double the tonnage taken in the corresponding period in July. Specifications also showed an improvement. Local prices remain firm and some business for early shipments from mills east of here continues to be placed at 2.40c., base Pittsburgh. Bar iron is still weak, although concessions in price appear to have developed some business. Most orders are being placed at 2.40c., Chicago mill, although some small lots continue to bring as high as 2.50c. and on particularly desirable specifications as low as 2.35c. has been done. New business in rail steel bars shows slight improvement with prices unchanged.

Mill prices are: Mild steel bars, 2.50c. to 2.60c., Chicago; common bar iron, 2.40c., Chicago; rail steel, 2.30c., Chicago mill.

Jobbers quote 3.20c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 4.55c. for rounds and 5.05c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 3c. base; hoops, 4.55c.; bands, 3.95c.

Wire Products.—Fall demand is a little late in developing, but the trade is confident it will make itself felt soon. Most mills are now in a position to make fairly early shipments against new business. For prices, which are unchanged, see Finished Iron and Steel, f.o.b., Pittsburgh, page 512.

We quote warehouse prices f.o.b. Chicago: No. 6 to No. 9 bright basic wire, \$3.90 per 100 lb.; extra for black annealed wire, 15c. per 100 lb.; common wire nails, \$3.80 per 100 lb.; cement coated nails, \$3.25 per keg.

Rails and Track Supplies.—With the extension of the present rail price of \$43 a ton to cover deliveries over the first half of 1924, the railroads are proceeding to complete their purchases for that period. Four western lines have placed a total of 68,000 tons with a local mill. Among these were the Union Pacific, which was inquiring for 50,000 tons, and the Wabash, which was in the market for 10,000 tons. Including the orders placed earlier in the summer on an open price basis, rails placed by all American lines for 1924 delivery are estimated at more than 350,000 tons. Pending rail inquiries from western roads total 40,000 tons. Practically all the carriers that have not bought are preparing to enter the market and orders to be placed early this fall are expected to aggregate twice the tonnage thus far contracted for. Necessary angle bars are in most cases bought with the rails, while the practice of the various roads with reference to the other track supplies varies. In some instances they are ordered with the rails, but more often they are placed separately.

Standard Bessemer and open-hearth rails, \$43; light rails, rolled steel, 2.25c., f.o.b. makers' mills.

Standard railroad spikes, 3.25c. mill; track bolts with square nuts, 4.25c. mill; iron tie plates, 2.85c. mill; steel tie plates, 2.60c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.90c. base and track bolts 4.90c. base.

Bolts and Nuts.—Prices are still unsteady, with demand light.

Reinforcing Bars.—While there are still a number of attractive projects on the market involving concrete bars, building construction as a whole appears to be on the decline and competition for such business as is coming up is keen. No action has yet been taken toward the purchase of the bars required for the north side sewage disposal plant of the Sanitary District, Chicago, which will involve 6000 tons. Despite the advanced season, considerable road work is still being undertaken. Fully 1000 tons for Illinois state bridge work is pending. Lettings include:

St. Paul, Minn., water department, Mississippi River conduit, 500 tons, to C. A. P. Turner Co.

Illinois State road and bridge work, 250 tons, to Concrete Steel Co.

Minnesota road work, 100 tons, to Kalman Steel Co.

Filter house and dryer building, Jones Island, Milwaukee, Wis., 100 tons, to Kalman Steel Co.

Grenada apartment building, Chicago, 150 tons, to Olney J. Dean.

Pending business includes:

Evanston, Ill., city filtration plant, 200 tons, bids in.

State of Illinois, bridge work, 1000 tons.

Golden Rule Building, St. Paul, Minn., 800 tons.

Old Material.—The market is exceedingly quiet in all departments. Even trading among dealers is at a low ebb. Prices show little change, but the feeling of the trade is more optimistic, probably because of evidences of strength in market centers east of here. Railroad offerings include the Santa Fé, 4000 tons; the Chesapeake & Ohio, 800 tons; the Missouri, Kansas & Texas, 1700 tons; the Chicago Great Western, 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	\$21.00 to \$21.50
Cast iron car wheels	19.50 to 20.00
Relaying rails, 56 and 60 lb.	23.50 to 29.50
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	20.00 to 20.50
Rolls for rolling	17.50 to 18.00
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards cut apart	16.50 to 17.00
Shoveling steel	15.75 to 16.25
Drop forge flashings	10.00 to 10.50
Hydraulic compressed sheets	12.50 to 13.00
Axle turnings	12.00 to 13.50
Steel angle bars	17.25 to 17.75

Per Net Ton

Iron angle and splice bars	22.00 to 22.50
Iron arch bars and transoms	22.00 to 22.50
Iron car axles	25.50 to 26.00
Steel car axles	17.00 to 17.50
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.50 to 10.00
Cut forge	14.25 to 14.75
Pipes and flues	9.50 to 10.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
Steel knuckles and couplers	18.50 to 19.00
Coil springs	19.00 to 19.50
No. 1 machinery cast	17.50 to 18.50
No. 1 railroad cast	17.00 to 17.50
No. 1 agricultural cast	17.00 to 17.50
Low phos. punchings	16.00 to 16.50
Locomotive tires, smooth	15.00 to 15.50
Machine shop turnings	8.00 to 8.50
Cast borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Stove plate	15.00 to 15.50
Grate bars	12.75 to 13.00
Brake shoes	14.00 to 14.50
Railroad malleable	18.00 to 18.50
Agricultural malleable	16.50 to 17.00

The plans for the industrialization of the Old Hickory Powder Plant at Jacksonville, Tenn., are to continue, although an incorrect impression has gone forth to the contrary, owing to an arrangement between the Government and the Nashville Industrial Corporation, involving a receivership for the Nashville Industrial Corporation. There is apparently to be no stop in developing an industrial city out of this war expenditure and all sales contracts made by the Nashville Industrial Corporation and now existing will be taken over and consummated by the receivers, who will operate as the Old Hickory Powder Plant receivers.

New York

Steel Bookings at Half Second Quarter Rate— Pig Iron Shades \$25

NEW YORK, Aug. 21.—Without what may be called a buying movement, a fair amount of business is being done in pig iron. Of the 500 tons of foundry iron recently inquired for by a malleable interest 250 tons was bought, and a New Jersey foundry took 500 tons of iron having a narrow range in phosphorus content. The Ingersoll-Rand Co. has inquired for 1500 tons, manganese 0.80 to 1.10 per cent and phosphorus 0.30 to 0.50 per cent, and is expected to close at once. Deliveries are to be made within 30 days. Generally the new inquiries are for small lots. A coupler company is asking for 1000 tons of malleable for delivery at the rate of 200 tons a week beginning Sept. 1. The same company is reported in the market for basic. There is some difference of statement regarding the extent to which the \$25 base is being maintained. It is still possible to do \$24.50, and this applies to the Buffalo district, which latterly has been regarded as on the \$25 basis. A number of buyers are holding down their inventories, and there are cases in which iron is being called for sooner than was counted on. For the most part the price situation is unchanged from a week ago and there are indications that present conditions will continue into September, signs of weakness alternating with claims of greater firmness.

We quote delivered in the New York district as follows, having added to furnace prices \$2.27 freight from eastern Pennsylvania, \$4.91 from Buffalo and \$5.44 from Virginia:

East. Pa. No. 1X fdy., sil. 2.75 to 3.25....	\$27.77
East. Pa. No. 2X fdy., sil. 2.25 to 2.75....	27.27
East. Pa. No. 2, sil. 1.75 to 2.25....	\$27.02 to 27.27
Buffalo, sil. 1.75 to 2.25.....	28.91 to 29.41
No. 2X Virginia, sil. 2.25 to 2.75.....	32.94
No. 2 Virginia, sil. 1.75 to 2.25.....	32.44

Ferroalloys.—A sale of 100 tons of ferromanganese for prompt shipment is the largest one noted in some time. There have also been a few carload lots disposed of. Some resale alloy has brought lower prices than the regular contract price of \$117.50, seaboard and furnace, but it is stated that this has all been cleaned up. Spiegeleisen is in light demand at prevailing quotations, which is also true of 50 per cent ferrosilicon and of ferrochromium.

Cast-Iron Pipe.—Prices continue firm with makers generally sold well up to the end of the year. A few municipal tenders are appearing from time to time. Although new bids have been submitted on the 20,500 tons of water pipe for Porto Rico, no report has been made yet on the opening of the bids. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, \$62.30; 4-in. and 5-in., \$67.30; 3-in., \$77.30, with \$5 additional for Class A and gas pipe. The soil pipe market is still weak with sellers desirous of considering only prompt deliveries at the prevailing discounts. We quote discounts of both Northern and Southern makers, f.o.b. New York, in carload lots, for prompt shipment, as follows: 6-in. standard, 39½ to 40% per cent off list; heavy, 49½ to 50% per cent off list.

Finished Iron and Steel.—Business in steel products being put on the books of the mills is probably not over 50 per cent of the volume which was booked during the best months of the year, March, April and May. The only important new tonnage is in structural projects. The total volume of such is not impressive, but it is fairly good considering the quiet in all other lines. Prices are holding firm, the only exception being that slight concessions have been made on plates for Pacific Coast shipment, but this business has of late come to be regarded very much as is export trade, hence concessions are not unusual. The total structural steel contracted for for buildings in second quarter in the metropolitan district (not inclusive of bridges, tunnels, subway work, etc.) has been computed by L. F. Caproni of the Hay Foundry & Iron Works, New York, to be 72,000 tons. This shows quite a drop from the first

quarter, when such work put under contract totaled 143,000 tons. As the capacity for such work in the shops of the New York district is 150,000 tons per quarter, the total for the first half of the year was about 70 per cent of capacity, while for the second quarter alone the total business was only little more than 40 per cent of capacity. The Erie Railroad is expected shortly to distribute orders for 35,000 tons of rails.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.74c.; plates and structural shapes, 2.84c.; bar iron, 2.74c.

Warehouse Business.—Business continues fairly active, although the improved mill shipments now being made to the larger consumers are undoubtedly curtailing some of the buying from stock that was prevalent when mills could only offer rather extended delivery. Prices generally are unchanged. Sheets continue weak with sales at as low as 4.50c. per lb. base for black and 5.50c. per lb. base for galvanized. Business in wrought iron and steel pipe is quiet but discounts are unchanged. There is still some slight shading reported on small lots of soft steel bars but sheets continue the weakest spot in the warehouse market in this district, as some sellers, it is pointed out, are disposing of stocks of sheets on a basis of original cost rather than cost of replacement and figuring profits on a very narrow margin. We quote prices on page 530.

Old Material.—On some grades the market seems to be slightly firmer this week, but there is apparently a difference of opinion among dealers and brokers as to the actual underlying tendency. No. 1 heavy melting steel is stronger by about 50c. per ton, being quotable at \$16 delivered eastern Pennsylvania with shipments going forward to Coatesville, Pottsville and Harrisburg. Shipments to Conshohocken, Pa., are reported to have been held up temporarily. While railroad grade or equivalent is still quoted at \$16 per ton delivered eastern Pennsylvania, there are rumors of prices as high as \$16.50 per ton, delivered, being paid and some yards in this district are said to be holding out for the higher price, which they claim is obtainable. On the other hand, brokers claim that they cannot pay above \$16. Stove plate continues firm with shipments going forward to a Harrisburg consumer and New Jersey foundries, paying about \$17 or more delivered. A fair range on this grade is \$13 to \$14 per ton, New York. Borings and turnings are still quoted at \$12.50 per ton, delivered to Bethlehem, Pa., machine shop turnings at \$13.50 and \$14 per ton, delivered Phoenixville, Pa., and some shipments of borings are reported going to Harrisburg at \$14.50 per ton. Specification pipe is still quiet with practically the only activity at present in shipments to Lebanon, Pa., at \$14.50 per ton. About 1000 tons of rerolling rails is reported bought last week by an eastern Pennsylvania mill at \$18.50 per ton. The few shipments going to Weirton and Monessen, Pa., are reported to be at \$17.50 and \$18 per ton delivered, but practically none of this tonnage is moving from this district.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard.....	\$12.00 to \$12.50
Steel rails, short lengths, or equivalent	12.75 to 13.25
Rails for rolling.....	15.00 to 17.00
Relaying rails, nominal.....	25.00 to 26.00
Steel car axles.....	19.00 to 20.00
Iron car axles.....	25.00 to 26.00
No. 1 railroad wrought.....	14.00 to 14.50
Wrought iron track.....	13.50 to 14.00
Forge fire	9.50 to 10.00
No. 1 yard wrought, long.....	13.00 to 13.50
Cast borings (clean).....	10.00 to 10.50
Machine-shop turnings	9.50 to 10.00
Mixed borings and turnings.....	9.00 to 10.00
Iron and steel pipe (1 in. diam., not under 2 ft. long).....	10.25 to 10.75
Stove plate	13.00 to 14.00
Locomotive grate bars.....	12.50 to 13.50
Malleable cast (railroad).....	18.00 to 19.00
Cast-iron car wheels.....	17.00 to 18.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast.....	\$19.00 to \$20.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	18.00 to 19.00
No. 1 heavy cast, not cupola size	16.00 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	16.00 to 17.00

Coke.—The market is stronger than for several weeks, in part because of the emphatic disagreements in the anthracite conferences. Standard foundry coke

is firm at \$5.75 to \$6.75 for well-known brands, and standard furnace coke ranges from \$4.75 to \$5.25 per ton. Renewed demand for crushed coke for domestic consumption has sprung up and the price has advanced above \$6, as high as \$7 being quoted. By-product coke from New Jersey ovens continues at \$11.41, Newark and Jersey City. Contract sales of such coke have been in considerable volume and the price has not been affected by the recent weakness in Connellsville coke.

Cincinnati

Slight Improvement in Inquiry and Prices Practically Unchanged

CINCINNATI, Aug. 21.—The pig iron market was quiet during the past week, and only a few sales ranging from carloads to 200 tons were reported. There is a slightly improved tone to the market this week, and several fair sized inquiries, mostly however from other districts, are being worked on. A large automobile manufacturer is inquiring for 1400 tons of silvery iron for fourth quarter, a steel castings manufacturer for 1000 tons of low phosphorus iron and a stove company for 500 tons of Southern foundry. A nearby melter is also in the market for 600 tons of foundry iron for September delivery. A number of other inquiries, ranging up to 200 tons, have come out, some of them being for special analysis irons. Sales last week included one of 500 tons of Northern iron and 400 tons of silvery to a Michigan melter and 400 tons of Southern charcoal iron to a roll maker in the Pittsburgh district. Prices generally show no change, although it is said that resale iron can still be had below the furnace schedules, which are now being firmly held; \$26, Ironton basis, continues as the market, with \$23.50, Birmingham, the price asked by Tennessee furnaces on standard Southern iron. Alabama furnaces continue to quote \$27, Birmingham, but this price has not been tested by an inquiry of any size. Silveries are unchanged. Jisco furnace in Jackson County has gone out for relining.

Based on freight rates of \$4.05 from Birmingham and \$2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)....	\$27.55
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	28.05
Ohio silvery, 8 per cent.	36.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2) ..	28.27
Basic Northern	27.27
Malleable	28.27

Finished Material.—Orders were scarce with most companies last week, those being placed being for immediate shipment. Some interest is being shown in fourth quarter prices, however, particularly on sheets. Some of the independent mills are reported to have indicated to their regular customers that fourth quarter prices will be practically the same as those of third quarter, with the possible exception of an advance of \$2 per ton on blue annealed grades. Bars, shapes and plates are quiet, but there are no evidences of lower prices being quoted. On reinforcing bars, however, some mills are willing to accept 2.30c., while others are quoting 2.40c. and 2.50c. Plates and shapes are selling at 2.50c. There is little activity in wire nails and other wire products, the large buyers being already under contract. Some wire mills are said to be in need of business. Bolts and nuts are quiet. There has been some little inquiry for cast iron pipe, and the City of Newport, Ky., is expected to purchase against its recent inquiry. Covington, Ky., will also shortly be in the market for several hundred tons.

Cincinnati jobbers quote: Iron and steel bars, 3.50c.; reinforcing bars, 3.60c.; hoops, 4.55c.; bands, 4.25c.; shapes, 3.60c.; plates, 3.60c.; cold-rolled rounds, 4.50c.; cold-rolled flats, squares and hexagons, 5c.; No. 10 blue annealed sheets, 4.25c.; No. 28 black sheets, 5.35c.; No. 28 galvanized sheets, 6.35c.; No. 9 annealed wire, \$3.60 per 100 lb.; common wire nails, \$3.60 per keg base.

Structural Material.—The Louisville & Nashville Railroad has awarded 450 tons of crossings work to the American Bridge Co., and 400 tons to the Mt. Vernon Bridge Co. Bridge work, involving 1000 tons, on which bids were taken last week, will not be awarded

at this time. Frank Hill Smith, Inc., is low bidder on the general contract for the McCall Publishing Co.'s new plant at Dayton, Ohio. A number of new projects, involving less than 100 tons, are up for figures. Opening of bids on the Kosair Temple, Louisville, Ky., in which about 450 tons of steel are involved, has been postponed till Aug. 28.

Warehouse Business.—Local jobbers report some improvement in the demand for warehouse materials, more especially in bars, plates, small angles and sheets. Wire products are also showing a slight improvement. Prices are unchanged.

Coke.—A better tone is evident in the coke market, and more activity in foundry and domestic fuels is noted. Prices are unchanged from last week.

Old Material.—A steel mill in this district bought about 3000 tons of heavy melting steel last week at \$17.50, delivered. This was the outstanding transaction. Inquiries are more numerous, but some dealers are inclined to regard them more as feelers than an intention to purchase. Prices are firmer, but not any higher. On cast grades carload lots continue to be the only activity.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	\$12.50 to \$13.00
Iron rails	15.00 to 15.50
Relaying rails, 50 lb. and up.	28.00 to 28.50
Rails for rolling	16.00 to 16.50
Heavy melting steel	14.50 to 15.00
Steel rails for melting	14.50 to 15.00
Car wheels	14.50 to 15.00

Per Net Ton	
No. 1 railroad wrought	12.50 to 13.00
Cast borings	9.00 to 9.50
Steel turnings	8.50 to 9.00
Railroad cast	16.00 to 16.50
No. 1 machinery cast	18.50 to 19.00
Burnt scrap	11.50 to 12.00
Iron axes	21.50 to 22.00
Locomotive tires (smooth inside) ..	13.50 to 14.00
Pipes and flues	8.50 to 9.00

St. Louis

Pig Iron Buying Broadening Somewhat—Dealers Stocking Old Material

ST. LOUIS, Aug. 21.—Further improvement in actual sales and inquiry features the pig iron market. Reserve stocks of consumers are running low, and with the melt continuing at its present pace, a real shortage is in prospect with many important plants unless they replenish in the near future. During the past three weeks there has been a steady growth in the ordering of small lots up to 100 tons, and where such sales are made the seller is urged to effect prompt delivery, and even furnish car numbers where possible. Both mills and foundries have booked a satisfactory volume of small orders of late, and sentiment is generally optimistic as to business during the fall. The largest transaction reported during the past several days was 1000 tons of foundry iron to a Davenport, Iowa, melter for delivery through fourth quarter or sooner. A local brokerage interest purchased 250 tons, and a jobbing foundry took 150 tons for spot shipment. The leading producer reports sales aggregating 500 tons, of which 175 tons went to a St. Louis machinery manufacturer. Inquiries pending approximate 3000 tons. Southern iron is quoted here in a range from \$23.50 to \$27, and a small resale tonnage went as low as \$22.50. Northern is unchanged on a basis of \$26.60 to \$27, Chicago. The leading local producer quotes \$27.50 to \$28.50, f.o.b. Granite City.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices \$2.15 freight from Chicago, \$3.23 from Birmingham (rail and water), \$5.17 from Birmingham, all rail, and \$1 cents average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	\$29.16
Northern malleable, sil. 1.75 to 2.25	29.16
Basic	29.16
Southern fdy., sil. 1.75 to 2.25	29.17

Finished Iron and Steel.—While no large inquiries or sales were reported, producers and selling agencies are enjoying a persistent steady small business, which

in the aggregate makes an excellent showing. This is true particularly of structural steel interests, who report numerous small orders ranging from 25 to 75 tons. Since the second week of August there has been a slight improvement in sales of the warehouses. July business of boiler makers and machinery builders show gains of 14 to 42 per cent over the same month in 1922. Railway supply interest also report sales well in excess of last year, but the peak seems to be passed with them, as totals in July were under those of May and June. A sharp decrease in orders for all varieties of materials from the oil fields is noted. A local automobile maker has ordered 750 tons of steel for delivery through October.

For stock out of warehouse we quote: Soft steel bars, 3.35c. per lb.; iron bars, 3.35c.; structural shapes, 3.45c.; tank plates, 3.45c.; No. 10 blue annealed sheets, 4.45c.; No. 28 black sheets, cold rolled, one pass, 5.20c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, 4.15c.; boiler rivets, 4.25c.; tank rivets, $\frac{7}{8}$ in. and smaller, 50-5 per cent off list; machine bolts, 45-5 per cent; carriage bolts, 40-5 per cent; lag screws, 50-5 per cent; hot pressed nuts, square or hexagon blank, \$2.50; and tapped, \$2.50 off list.

Coke.—The market continues dull and featureless on all grades and varieties. The recent extreme heat served to accentuate slowness on the part of domestic buyers, and dealers do not look for improvement before early in September. By-product manufacturers are operating at or near capacity, and their stock piles are assuming large proportions. Despite this fact no price concessions have been made, mainly for the reason that the producers believe they will be able to market easily all surplus in the event of a strike of anthracite coal miners. Thus far, however, users of anthracite have failed utterly to display any excitement over the coal mine labor situation. The only sale of metallurgical coke of any size was 1000 tons to an Iowa consumer for shipment over the remainder of 1923.

Old Material.—Save for a few purchases of cast grades by job and stove foundries, buying continues at a minimum. Dealers, however, have been increasing their holdings, and yard stocks are now larger than at any time in more than three months. Recent heavy offerings by the railroads have been readily absorbed by the dealers, who, conditions considered, paid good prices for all material offered. Stocks in melters hands are light, and sellers are being pressed for deliveries of certain materials. Stove plants are planning to increase operations early in September, and are buying some scrap. New railroad offerings included 2700 tons by the Wabash, 2000 tons by the Missouri, Kansas & Texas and 4500 tons by the Rock Island.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	\$16.00 to \$16.50
Rails for rolling	17.50 to 18.00
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under ..	26.00 to 27.00
Relaying rails, 70 lb. and over ..	33.50 to 34.50
Cast iron car wheels	18.50 to 19.00
Heavy melting steel	16.50 to 17.00
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	16.50 to 17.00
Per Net Ton	
Heavy axles and tire turnings ..	12.50 to 13.00
Steel angle bars	15.25 to 15.75
Iron car axles	25.00 to 26.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms ..	20.00 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	16.50 to 17.00
Railroad springs	19.00 to 19.50
Cast iron borings	12.00 to 12.50
No. 1 busheling	16.75 to 17.25
No. 1 railroad cast	18.00 to 18.50
No. 1 machinery cast	18.50 to 19.00
Railroad malleable	17.00 to 17.50
Machine shop turnings	11.50 to 12.00
Champion bundled sheets	8.00 to 8.50

For the new cold-rolled strip steel plant to be started at Warren, Ohio, by C. G. Thomas and associates, Barton R. Shover, Oliver Building, Pittsburgh, has been retained as consulting engineer. As announced in THE IRON AGE of Aug. 16, a company has been in process of organization to take over the plant of the Eastern Ohio Mfg. Co. The equipment is to include two stands of 12-in., four stands of 10-in. and four stands of 8-in. cold strip mills, with all auxiliary equipment.

Boston

Pig Iron Sales Show Further Shrinkage— Scrap Prices Firmer

BOSTON, Aug. 21.—Pig iron sales show a further shrinkage, New England foundries not covered for fourth quarter showing little inclination to buy. Certain local representatives of furnaces maintain the past week was the quietest experienced this year. Interest centered in the purchase of 300 tons by the Sullivan Machinery Co., Claremont, N. H. Details are not verified, but the company is credited with buying 100 tons of Buffalo malleable iron at \$24.50, furnace, 100 tons of silicon 2.25 to 2.75 per cent of New York State iron at \$24.50, furnace, and 100 tons of silicon of 3.25 to 3.75 per cent of eastern Pennsylvania at \$25.50, furnace, this sale being the largest individual one reported. On regular foundry iron, Buffalo furnaces apparently are holding at \$25 base with 50c. differentials, although on attractive tonnages the latter undoubtedly would be wavered. Eastern Pennsylvania furnaces quote \$25 base and 50c. differentials, but No. 2 plain, No. 2X and No. 1X are offered at \$25. Western Pennsylvania prices are somewhat unsettled, it being intimated \$24.50, furnace base, and possibly less, can be done on attractive tonnages. Car lots of Virginia sold the past week at \$26, furnace base, with regular differentials, and although very much out of line with other irons, Alabama in car lots sold at \$27 base with differentials. Additional sales of local charcoal iron at \$40 to \$60 a ton, depending on quality, are reported. Furnace stocks are now down to the vanishing point and prospects of blowing in are rather remote.

We quote delivered prices on the basis of the latest reported sales as follows, having added \$3.65 freight from eastern Pennsylvania, \$4.91 from Buffalo, \$5.92 from Virginia, and \$9.60 from Alabama.

East. Penn., sil. 2.25 to 2.75	\$29.15 to \$30.15
East. Penn., sil. 1.75 to 2.25	28.65 to 29.65
Buffalo, sil. 2.25 to 2.75	29.91 to 30.41
Buffalo, sil. 1.75 to 2.25	29.91 to 30.41
Virginia, sil. 2.25 to 2.75	32.42 to 32.92
Virginia, sil. 1.75 to 2.25	31.92 to 32.42
Alabama, sil. 2.25 to 2.75	35.10 to 37.10
Alabama, sil. 1.75 to 2.25	34.60 to 36.60

Warehouse Business.—Demand for iron and steel holds up well. Buying of bolts and nuts is broader due to a belief that new prices, to be issued around Sept. 1, will show advances. Rivets also are selling more freely from warehouse stocks. Local supplies of nails, particularly wire, are more or less broken, and mills continue several weeks behind on shipments. The American Steel & Wire Co., Worcester, Mass., has sufficient business on its books to keep the plant operating at capacity two months.

Soft steel bars, \$3.61½ a 100 lb. base; flats, \$4.40; regular concrete bars, \$3.76½; deformed bars, stock lengths, \$3.76½ to \$3.89; structural steel, \$3.71½; tire steel, \$4.80 to \$5.15; open-hearth spring steel, \$8 to \$10; crucible spring steel, \$12; regular steel bands, \$4.80; bands over 6 in. wide, \$5.05 to \$5.30; hoop steel, \$5.80 to \$6.30; cold rolled steel, \$4.75 to \$5.25; refined iron, \$3.61½; best refined, \$4.75; Wayne iron, \$5.50; Norway iron, \$6.60 to \$7.10.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. are maintaining a price of \$13.50, delivered, in New England on by-product foundry coke. Foundries are specifying against contracts a little more freely than heretofore, and ovens are making fairly prompt shipments. Some delay in shipments of crushed coke to foundries has been experienced, however, due to the pressure on ovens for deliveries of domestic fuel.

Old Material.—Quotations on certain kinds of old material are firmer. Business continues exceptionally quiet even for August, but general opinion is there will be a decided improvement next month. The firmer prices therefore are due to growing optimism, to conditions in other markets and to an effort to establish prices at which holders of material will sell. The market for heavy melting steel averages 50c. a ton higher, while railroad and yard wrought have strengthened even more. Slightly better inducements are offered by brokers on turnings and borings. Foundries

display little interest in machinery cast scrap, however, and prices remain unchanged.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast.....	\$22.00 to \$23.00
No. 2 machinery cast.....	20.00 to 21.00
Stove plate.....	16.00 to 17.00
Railroad malleable.....	20.00 to 21.00
Street car axles.....	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston common rate shipping points:

No. 1 heavy melting steel.....	\$12.00 to \$12.50
No. 1 rail wrought.....	14.00 to 14.50
No. 1 yard wrought.....	13.00 to 13.50
Wrought pipe (1-in. in diam., over 2 ft. long).....	10.00 to 10.25
Machine shop turnings.....	8.25 to 8.75
Cast iron borings, rolling mill.....	9.50 to 10.00
Cast iron borings, chemical.....	12.00 to 12.50
Blast furnace borings and turnings.....	8.00 to 8.50
Forged scrap and bundled skeleton.....	9.00 to 9.50
Shafting.....	18.00 to 18.50
Street car axles.....	18.00 to 18.50
Rails for rerolling.....	13.50 to 14.00

Philadelphia

Slight Pick-Up in Demand for Finished Steel—Scrap Market Stronger

PHILADELPHIA, Aug. 21.—With the iron and steel trade waiting for signs that will indicate what may be expected in the way of business developments, mid-August has brought little that is either encouraging or discouraging. Both buyers and sellers are still marking time, yet in finished steel there are a few straws that seemingly point to an early broadening of the demand. In a few products, notably sheets, strip steel and other light forms of finished steel, there has been a better inquiry, some of it covering fourth quarter requirements. In plates, shapes and bars the situation is pretty much unchanged, though the tonnage being placed on mill books is probably slightly greater than that of July. There is an absence of specific tonnage of important size. The easing up of the plate demand is indicated by the request of the Pennsylvania Railroad of some mills to suspend shipments of car plates to Altoona, where material has been received faster than it can be handled, whereas not more than 60 days ago the Altoona shops were urgently seeking plates for early shipment.

Pig iron demand has not increased during the week and is made up mostly of a fair number of small-lot orders. In scrap there is a firm undertone, marked by a few price advances, while dealers are holding material for 50c. or \$1 a ton above today's nominal quotations.

Ore.—Last week's receipts of iron ore from abroad totaled 21,950 tons, of which 12,400 came from Cuba, 2350 from Sweden and 7200 from French Africa.

Ferroalloys.—There is very little demand for either domestic or foreign ferromanganese, both of which are still quoted at \$117.50, seaboard or furnace. Occasional carloads of resale material are being sold at about \$115.

Pig Iron.—Nearly all of the eastern Pennsylvania furnaces now name \$25 as their minimum on foundry iron, this price applying to No. 2 plain, with 50c. differentials for No. 2X and No. 1X. It is not quite established, however, that quotations at least 50c. a ton lower are not still being made, though there is no definite confirmation that such is the case. Two inquiries now pending of 1500 tons each, one from a New England company and the other from a New Jersey machinery plant, may determine when closed just how firmly the \$25 base is being held. The volume of business in the past week has not been large, but there is a fair number of orders ranging from a carload to 100 or 200 tons. In Virginia the pig iron situation is much more unsatisfactory from the producer's point of view than in this district. Virginia operators are finding it difficult to obtain \$26, base, for their product, and quotations of \$25.50 have appeared more frequently, and it is intimated that on an attractive tonnage one or two furnaces might quote \$25. A Virginia cast iron pipe company, which recently closed for 7500 tons, is ex-

pected to buy 2500 tons more this week. Eastern Pennsylvania makers of copper bearing low phosphorus iron have reduced quotations from \$32 to \$30, furnace. Two or three inquiries for low phosphorus iron total 1500 to 2000 tons.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to \$1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.....	\$25.26 to \$26.64
East. Pa. No. 2X, 2.25 to 2.75 sil.....	25.76 to 26.14
East. Pa. No. 1X.....	26.26 to 26.76
Virginia No. 2 plain, 1.75 to 2.25 sil.....	30.67 to 31.17
Virginia No. 2X, 2.25 to 2.75 sil.....	31.17 to 31.67
Basic delivered eastern Pa.....	25.00
Gray forge.....	25.50 to 26.00
Malleable.....	26.26 to 26.84
Standard low phos. (f.o.b. furnace).....	29.00 to 30.00
Copper bearing low phos. (f.o.b. furnace).....	30.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.	
Continental foundry, 1.80 to 2.50 sil.....	\$25.50
Continental foundry, 2.50 to 3.25 sil.....	26.50
Low phos., copper free, guar. not over 0.035 per cent phos.....	31.50
Continental, phos. 1.50; sil. 2 to 3.....	25.50

Semi-Finished Steel.—There is a little weakness in billets, but scarcely enough business has come out recently to test the market. It is possible that \$42.50, Pittsburgh, has been shaded for open-hearth rerolling billets, but this is based only on the fact that one or two mills have lost business on which they have quoted that price. Eastern mills name \$50, Pittsburgh, on forging billets, but doubtless \$47.50 would have to be quoted to take any attractive business.

Plates.—Plates are very easy to obtain for prompt shipment. Some rollings can be had in less than a week. Few of the eastern mills have more than two weeks' active specifications on their books. Two months ago the Pennsylvania Railroad was searching for plates for prompt shipment for car repair work at Altoona, but within the past week repair material has been shipped to the road's car shops so freely that requests for suspensions have come to some mills. On eastern business the plate price remains firm at 2.50c., Pittsburgh, but on Pacific Coast orders slight concessions, usually about \$2 a ton, have been made, which is not an unusual occurrence on western business. California business now pending totals close to 2000 tons.

Structural Material.—Not many new building projects are coming out for bids. Local fabricators expect to have before them soon plans for a new hotel at Broad and Locust Streets, which will take 5000 to 6000 tons of steel. The price situation remains unchanged, with one eastern mill quoting 2.40c., Pittsburgh, and others 2.50c.

Bars.—Mills still have considerable steel bar business on their books and there is no anxiety about new specifications. The price of steel bars remains firm at 2.40c., Pittsburgh, while bar iron is equally firm at the same figure, the only exception being occasional quotations of 2.35c. by one maker.

Sheets.—Inquiry for sheets for delivery over the remainder of third quarter and for fourth quarter requirements have been received in the past week. Less is now heard of price concessions, even black sheets, which had been selling occasionally at 3.75c., Pittsburgh, apparently being firm at 3.85c. Blue annealed at 3c. and galvanized at 5c. have at no time recently shown any weakness.

Warehouse Business.—Local jobbers continue to do a very satisfactory business in steel out of stock. Prices are unchanged and for local delivery are as follows:

Soft steel bars and small shapes, 2.55c.; iron bars (except bands), 3.55c.; round edge iron, 3.75c.; round edge steel, iron finished, 1½ x ¼ in., 3.75c.; round edge steel planished, 4.55c.; tank steel plates, ¼ in. and heavier, 3.65c.; tank steel plates, ½ in., 3.95c.; blue annealed steel sheets, No. 10 gage, 4.25c.; black sheets, No. 28 gage, 5.15c.; galvanized sheets, No. 28 gage, 6.25c.; square twisted and deformed steel bars, 3.65c.; structural shapes, 3.65c.; diamond pattern plates, ¼ in., 5.40c.; ½ in., 5.60c.; spring steel, 5c.; round cold-rolled steel, 4.35c.; squares and hexagons, cold-rolled steel, 4.85c.; steel hoops, 1 in. and wider, No. 20 gage and heavier, 4.75c.; narrower than 1 in., all gages, 5.25c.; steel bands, No. 12 gage to ½ in., inclusive, 4.35c.; rails, 3.55c.; tool steel, 8.50c.; Norway iron, 7c.
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Coke.—Although furnace coke is still obtainable at \$4.50 and foundry coke at \$5.50, Connellsville, furnace operators seem less disposed to quote \$4.50 on furnace coke, due probably to the expectations of an anthracite coal strike, and some brokers name \$4.75 as a minimum.

Old Material.—A few eastern steel scrap consumers have evidenced more interest in buying, but offers of more than \$16, delivered, have been made in only one or two instances. If business is closed this week it probably will be on a basis not less than \$16.50, some brokers and dealers holding for \$17. The situation today is that dealers are more anxious to buy than to sell, believing that the market is due for a rise over the next few weeks. Most of the quotations on other grades of old material, as shown in the table below, are nominal in that any business to be done within the next week will probably be at 50c. to \$1 a ton above these figures. Among the items which have advanced slightly with increased demand are machine shop turnings for steel works use, bundled sheets and pipe, the latter being up at least \$1 a ton.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel.....	\$16.00 to \$16.50
Scrap rails	16.00 to 16.50
Steel rails for rolling	17.00 to 18.00
No. 1 low phos., heavy 0.04 and under	21.50 to 22.50
Cast-iron car wheels.....	20.00 to 21.00
No. 1 railroad wrought.....	18.00 to 19.00
No. 1 yard wrought	17.00 to 18.00
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.00 to 14.50
No. 1 busheling	15.50 to 16.00
Mixed borings and turnings (for blast furnace use)	12.50 to 13.50
Machine shop turnings (for steel works use)	14.00 to 14.50
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	14.50 to 15.00
Cast borings (for steel works and rolling mills)	15.00 to 15.50
Cast borings (for chemical plants)	18.00 to 19.00
No. 1 cast	20.00 to 21.00
Heavy breakable cast (for steel plants)	19.00 to 19.50
Railroad grate bars	17.00 to 18.00
Stove plate (for steel plant use)	17.00 to 17.50
Railroad malleable	19.00 to 20.00
Wrought iron and soft steel pipes and tubes (new specifications)	16.00 to 17.00
Shafting	22.00 to 24.00
Steel axles	24.00 to 26.00

Buffalo

Less Interest in Pig Iron—Pressure for Sheet Deliveries

BUFFALO, Aug. 21.—The flurry felt here earlier in the month has not kept up and recent sales are of the ordinary variety. Two unusual inquiries have served to break the monotony; one for 1500 tons of foundry iron of silicon 2.25 to 2.75 per cent for shipment to Phillipsburg, N. J., is engaging the attention of local sellers, but it is not expected that the business will be placed here. A railroad equipment maker is inquiring for 1000 to 2000 tons of basic iron for delivery at Depew, N. Y. The rest of new business offered is the usual run of car loads or 100-ton lots. The \$25 base price continues to hold firm, but \$24.50 is encountered in competition. Sellers do not look for any immediate advance in prices, nor do they think that the market will touch any lower figure. There is no disposition on the part of the consumers to buy for more than three of four weeks' needs. Total sales do not exceed 8000 tons.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.....	\$26.00
No. 2X foundry, 2.25 to 2.75 sil.....	25.50
No. 2 plain, 1.75 to 2.25 sil.....	25.00
Basic	26.00
Malleable	26.00
Lake Superior charcoal.....	32.28

Finished Iron and Steel.—Specifications have been heavier and both inquiries and new business is on a good scale. Prices are firm and the 2.40c. price on bars and 2.50c. price on shapes and plates has not been disturbed. There is an extraordinary demand for pipe and inquiries running as high as 200 tons have been general. The general run of sheet inquiries is for

100 to 150 ton lots. The 3.85c. price on black sheets is generally quoted but 3.75c. is encountered in stiff competition. Sheets are being used as fast as received and pressure for delivery is just as strong. Two unusual bolt orders have been placed outside of Buffalo; one order of three carloads for shipment to Rochester developed sharp competition.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.65c.; plates, 3.65c.; soft steel bars, 3.55c.; hoops, 4.65c.; bands, 4.35c.; blue annealed sheets, No. 10 gage, 4.45c.; galvanized steel sheets, No. 28 gage, 6.35c.; black sheets, No. 28 gage, 5.25c.; cold rolled round shafting, 4.70c.

Old Material.—A general renewal of confidence is apparent on all sides but is not reflected in the volume of new business. There is widespread expectation that there will be unusual buying before Sept. 15, because all stock piles are depleted. Demand for cast scrap is good and the supply is scarce. Only one mill is interested in buying heavy melting steel and is offered \$17, but has not been able to pick up any large tonnages at this offer.

We quote f.o.b. gross ton Buffalo as follows:

Heavy melting steel.....	\$17.00 to \$18.00
Low phos., 0.04 and under.....	23.50 to 24.50
No. 1 railroad wrought.....	15.00 to 16.00
Car wheels	16.50 to 17.00
Machine shop turnings.....	8.50 to 9.50
Cast iron borings	15.00 to 16.00
No. 1 bushelings	15.50 to 16.00
Stove plate	17.00 to 17.50
Grate bars	17.00 to 17.50
Bundled sheet stampings	10.00 to 11.00
No. 1 machinery cast	19.50 to 20.50
Hydraulic compressed	15.00 to 16.00
Railroad malleable	20.00 to 21.00

Cleveland

Reviving Demand from Automobile Foundries—Advance in Scrap

CLEVELAND, Aug. 21.—A St. Louis consumer purchased 25,000 tons of Lake Superior ore in the week, this being the only sale of any size reported recently. Ore firms are looking for little more buying this season. While some consumers did not purchase early in the season all the ore that they were expected to need, it is believed that with the slowing down of pig iron production few consumers will find it necessary to buy more ore to tide them over until spring.

Pig Iron.—There is still a fair demand for pig iron in foundry and malleable grades, mostly in small lots. One local interest sold 10,000 tons during the week, another 4000 tons and other sales probably made up a total of 20,000 tons. These sales included one 1500-ton lot and another nearly as large. Weak spots in the market are disappearing and prices below \$25 for foundry in the Valley district seem no longer in evidence. As a result the local price situation has firmed up somewhat, although the commoner quoted Cleveland price of \$26 for foundry iron was shaded to \$25.75 during the week. However, it is doubtful if a Cleveland quotation of below \$26 can now be secured. One Cleveland producer during the week opened its books for contracts for the fourth quarter at \$26 for foundry iron and a canvas of its trade brought out quite a few inquiries. Buyers evidently have come to the conclusion that prices will go no lower and some large consumers of foundry iron who have been buying from hand to mouth for some time are now figuring on their requirements for the remainder of the year. Among the sales was one fair-sized lot that was placed subject to the prices prevailing at the time of shipment. In addition to the sales of malleable iron to automobile foundries recently reported, an Ohio foundry specializing on automobile castings purchased 5000 tons of malleable iron in the week, this being divided among several producers. Following somewhat of a lull in the foundry end of the automotive industry, now that production is getting under way on new models, large specifications for pig iron for September shipment are being sent out by some of the automobile foundries and the indications are that the consumption by this industry will be

heavy during the remainder of the year. Basic iron is inactive, with the market apparently well established at \$25, Valley furnace. The American Rolling Mill Co. blew out two furnaces this week, one at Columbus, Ohio, and one at Ashland, Ky.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a \$3.02 freight rate from Jackson and \$6 rate from Birmingham:

Basic, Valley furnace.....	\$25.00
Northern No. 2 fdy., sil. 1.75 to 2.25.....	26.50
Southern fdy., sil. 1.75 to 2.25.....	29.50
Malleable	26.50
Ohio silvery, 8 per cent	37.52
Standard low phosph., Valley furnace.....	\$31.50 to 32.00

Bolts, Nuts and Rivets.—Price irregularity is in evidence in bolts and nuts, and concessions to the extent of 5 per cent from the regular discounts are being made by some manufacturers. Among new rivet inquiries is one from a Western oil company for 200 tons. Sharp competition still exists for desirable orders. The market is quotable at 3c. for structural and 3.10c. for boiler rivets for round lots, but in some cases makers are getting \$2 a ton higher.

Sheets.—The demand from Detroit automobile companies for blue annealed and body sheets has improved now that some of the car builders have started production on new models, but the demand is generally confined to early requirements. In other respects the market continues dull and some mills are in need of orders. Prices appear firm, except on black sheets, on which some mills are making a concession of \$2 a ton to 3.75c.

Reinforcing Bars.—New demand shows an improvement. Among inquiries is one for 170 tons for a sewage disposal plant for Euclid, Ohio. Other projects requiring unnamed tonnages include the Babies' and Children's Hospital, Cleveland, and a county home, Erie, Pa. Rail steel bars are unchanged at 2.30c. to 2.35c.

Semi-Finished Material.—A local producer has made several reservations of sheet bars for the fourth quarter subject to prices prevailing at the time of shipment. Without a recent test of prices, quotations on sheet bars, billets and slabs are unchanged at \$42.50, and it is expected that the introduction of the 8-hr. day will have a tendency to keep the market firm.

Finished Iron and Steel.—The market has a firmer tone and consumers seem to have come to the conclusion that present prices will be maintained. New demand is light, although some mills report a slight improvement. However, most consumers are following a hand-to-mouth policy in placing orders. Generally deliveries are better. This was brought out during the week in an inquiry for 900 tons of structural material and 600 tons of plates for a new power house in Cleveland for the Standard Oil Co., which was placed with a Massillon fabricator. Deliveries within three weeks were asked for and two or three leading producers were able to meet the dates. However, only a portion of the steel has yet been placed. The demand for plates is better than for most other lines, and local mills are booking about as much tonnage as they are shipping. However, some Eastern mills are now finding it difficult to take orders in this territory on the 2.50c. mill basis, owing to the fact that Pittsburgh district mills are now able to make better deliveries. Local mills quote plates at 2.50c. to 2.60c., the high price being usually for boiler steel. Inquiry in the building field shows some gain. Among new projects for which bids are expected to be asked for shortly is the Brotherhood of Locomotive Engineers Bank Building, Cleveland, that will require 3000 tons or more of structural material.

Jobbers quote steel bars, 3.36c.; plates and structural shapes, 3.46c.; No. 9 galvanized wire, 3.70c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.65c.; No. 28 galvanized sheets, 5.50c.; No. 10 blue annealed sheets, 3.75c. to 4.06c.; cold rolled rounds, 3.90c.; flats, square and hexagons, 4.40c.; hoops and bands, 1 in. and wider and 20 gage or heavier, 4.16c.; narrower than 1 in. or lighter than No. 20 gage, 4.60c.

Coke.—The coke market is dull and prices of standard Connellsville foundry coke are unchanged at \$5.50

to \$7 per net ton at oven. A price advance of 50c. has been made on medium sulphur furnace coke used for heating purposes in foundries, which is now quoted at \$4.50 to \$5.

Old Material.—Prices have stiffened as a result of the release of shipping orders for machine shop turnings by a leading Cleveland consumer and by some new demand that has developed from steel plants. A West Virginia steel company is understood to have purchased a round tonnage of heavy melting steel and compressed sheet steel, and other consumers are reported to have done considerable buying in a quiet way. Borings and turnings have advanced about \$1.50 a ton. Grate bars and stove plate have advanced \$3 a ton as a result of an active demand and limited supply, and the general tendency of the market appears to be upward on all grades. Dealers are offering \$18 for heavy melting steel and \$16.25 for compressed sheet scrap to fill recent orders from a West Virginia consumer and \$16.50 for heavy melting steel for delivery to a Cleveland steel plant.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel.....	\$16.00 to \$16.25
Rails for rolling.....	18.00 to 18.50
Rails under 3 ft.....	17.50 to 18.00
Low phosphorus melting.....	19.00 to 20.00
Cast borings	12.50 to 12.60
Machine shop turnings.....	11.00 to 11.50
Mixed borings and turnings.....	11.75 to 12.00
Compressed sheet steel.....	13.75 to 14.00
Railroad wrought	13.50 to 14.00
Railroad malleable	20.75 to 21.25
Light bundle sheet stampings.....	11.00 to 11.25
Steel axle turnings.....	14.50 to 15.50
No. 1 cast.....	19.50 to 20.50
No. 1 busheling.....	11.00 to 11.25
Drop forge flashings.....	10.50 to 11.00
Railroad grate bars.....	15.00 to 15.50
Stove plate	14.50 to 15.00
Pipes and flues.....	10.00 to 11.00

Making of Steel Disk Wheels

The solid, disk-type automobile wheel of the present day, growing use of which has consumed increased quantities of steel, harks back in design to early days of civilization, according to Walter Page, general manager of the Forsyth Brothers Co., a unit of the Motor Wheel Corporation. In an article in "The Pure Iron Era," published by the American Rolling Mill Co., Middletown, Ohio, he points out that the first wheel was probably a thick log cut from a tree trunk.

In the Forsyth plant 10 operations are performed by eight men from the steel sheets as received to the finished product. The entire operation in a single disk consumes but 15 sec., and thus a total of 2400 disks can be made in a 10-hr. day. They are stamped out of steel of 0.118 to 0.125 gage.

Warren G. Harding's efforts in relation to the elimination of the 12-hr. shift in the steel industry were made the subject of a tribute paid to his memory by Dean Mortimer E. Cooley of the University of Michigan and president of the Federated American Engineering Societies. "His moral support of the work of the engineering profession, his quiet and self-effacing manner and his sacrifice of self for the interests of the nation have been a source of inspiration and of stimulation to the engineers in their desire and endeavor to render an essential public service."

For superintendent of construction vacancies in the central office of the Veterans Bureau, Washington, the United States Civil Service Commission, Washington, will hold an examination for which application must be made by Sept. 25.

The Sullivan Machinery Co., Chicago, has formally opened its new plant at Michigan City, Ind., for the construction of heavy mining machinery.

Lake Erie-Ohio River Canal Opposed by Iron Maker

Some extravagant claims made by the proponents of the Lake Erie and Ohio River Canal, particularly as to the tonnage that would be available for such a waterway and the suggestion that lake vessels would come straight through from the great Lake Superior ore fields and other lake ports to Pittsburgh without change of crews or cargo, are sharply refuted by George L. Collard, general manager Shenango Furnace Co., Pittsburgh, in a communication to the Chamber of Commerce of Pittsburgh, and published in "Pittsburgh First," the official organ of that body.

As the Shenango Furnace Co. is engaged in the mining and transportation of ore, Mr. Collard, it is held, can speak with authority on the subject of lake transportation, and the tonnages of ore and coal moving on the Great Lakes. He points out with regard to the possibility of having lake boats come through the proposed canal to Pittsburgh, that the vessels carrying ore and coal on the lakes draw from 20 to 21 ft. of water, while the depth of the canal is to be only 12 ft. and that the depth of the Ohio River, with its modern dams, is only 9 ft. The lake boats vary in length and beam, Mr. Collard states, but the modern ones are over 600 ft. long and run as wide as 64 ft. at beam. The locks in the proposed canal are to be 340 ft. long and 45 ft. wide, dimensions, which he says, would not permit the entrance into them of even the smaller of the lake craft.

It has been claimed by supporters of the canal project that 107,000,000 tons of freight annually have been pledged. As to that Mr. Collard states:

"Such a tonnage as this would include practically all the ore and coal now transported by rail from all districts. Total ore tonnage through the Soo locks amounts to 60,000,000 tons in a big year. Less than one-third of this comes to Pittsburgh. The soft coal tonnage from all sources through the Soo locks amounts to 20,000,000 in a big year. It is hardly likely there will be much coal tonnage available for the canal as a great deal now originates in fields far removed from the rivers and the only means of shipping is the trunk railroads.

"W. C. Wilkins, formerly a prominent engineer of Pittsburgh, made an exhaustive study and published a report in 1917 showing that the building of this canal is impractical from the water standpoint and would not be a profitable venture if built. David Jamison, former member of the Canal Commission of Pennsylvania, also made an exhaustive study and an adverse report."

Dictionary of Specifications

Work has been started at the Bureau of Standards on the compilation of material for a dictionary or handbook of specifications for supplies purchased by Federal, State and municipal governments and public institutions. This work grew out of a meeting held in May, 1923, of State purchasing agents from all over the country, at which the cooperation of the various States was assured in this matter.

On July 11 a conference was held of various national organizations interested in the preparation and unification of purchase specifications and in their use from the point of view of both the producer and the consumer. This conference was called for the purpose of organizing an advisory committee to cooperate with the Department of Commerce and the national conference of State purchasing agents in the work of formulating purchase standards, specifications, and tests. Although no meeting of this advisory committee has yet been held, the various organizations represented are cooperating actively in the actual work of compiling the material for the dictionary, and a great deal of information has been supplied.

Correspondence conducted with the officers of trade associations and the purchasing agents of a large number of municipalities and public institutions has established the fact that all the individuals and groups for which the dictionary of specifications is being prepared

will welcome its appearance enthusiastically and cooperate actively in the preparation.

A collection is now being made of all available specifications prepared by the various departments and independent establishments of the Federal government and those used by State and municipal governments, public institutions, and the important national trade associations and technical societies. These specifications are being thoroughly card-indexed and classified. Care is being taken to pick out those specifications which are most urgently needed.

Blast Furnace Plant for Everett, Mass.

The Mystic Iron Works, Everett, Mass., has incorporated under Massachusetts laws, with a personnel closely identified with the Massachusetts Gas Companies, Boston. It is proposed, provided State and city authorities give consent, to erect a blast furnace for the production of pig iron on the Mystic River, Everett, in close proximity to the New England Coal & Coke Co.'s by-product coke ovens. The coke company is a subsidiary of the Massachusetts Gas Companies.

Present plans call for the erection of a modern type furnace of 500 tons daily capacity, which with stoves and other equipment will involve an investment of between \$3,000,000 and \$4,000,000. It will require a year or longer to complete the plant, which will be the first of its kind in New England, the others being charcoal furnaces of relatively small capacity. From time to time in the past 15 years the proposal for a Boston harbor blast furnace has been brought forward.

Interests back of the present project stress the advantage a furnace located in the Boston district would have in the matter of freights to New England foundries, which now obtain their pig iron from furnaces in the Buffalo district, eastern Pennsylvania, Virginia, and also from central and western Pennsylvania. The New England Coal & Coke Co. will supply the Mystic Iron Works with coke. Limestone will be obtained from deposits in Maine reported to be of excellent quality and accessible to water transportation. It is proposed to use Nova Scotia ores as well as Swedish and possibly Spanish, African and other foreign ores, all of which will be transported to Everett by water. The New England Fuel & Transportation Co., another subsidiary of the Massachusetts Gas Companies, owns and operates a fleet of modern steamers.

Nick-Bend Test for Wrought Iron

All of the laboratory work in connection with the investigation of the nick-bend test for wrought iron has been completed, and the report is being assembled for publication by the Bureau of Standards. The general conclusions which the results appear to warrant are given below: Crystalline areas appear most readily in the fractures obtained in the nick-bend test of those wrought irons in which the individual slag threads are small and uniformly distributed. The presence of steel in wrought iron, since it is conducive to this condition, favors the formation of such crystalline areas. The converse, however, is not true.

A crystalline area in the fracture is not a sure indication of the presence of steel in such wrought iron. The test cannot be used as a means for detecting high phosphorus iron. A rapid application of the load in the nick-bend test, usually by impact, is necessary for the formation of the crystalline areas. Distinction should be made between the crystalline areas on the tension and on the compression sides of the tested bar. The latter, in general, are not to be regarded as indicative of the structural condition of the metal.

The total shipments of iron ore from Canadian mines during the year 1922, according to the Dominion Bureau of Statistics, amounted to 17,971 net tons, as compared with 59,509 tons shipped in 1921. The production for 1922 was the lowest in the past 21 years, and included 300 tons of roasted siderite, and roasted magnetite to the extent of 15,890 tons produced in Ontario.

British Iron and Steel Market

Pig Iron and Finished Steel Weak—America Gets Rail Order from Japan— Tin Plate Steady

(By Cable)

LONDON, ENGLAND, Aug. 21.

Foundry and forge pig irons are weak. Market supplies have been increased by the Stockton race week holiday. Both domestic and export demand are poor.

Hematite is firm, on a slight improvement in the demand and decreased production. Seven furnaces now have been blown out and others are expected to be banked shortly.

Finished iron and steel are weak, though prices generally quotable are unaltered. A good line of angles has been sold at £8 10s. (1.73c. per lb.) f.o.b. There is good demand for plate cuttings, from China, and there are fair inquiries for plates and sheets, from Japan.

There is moderate demand for Continental iron and steel, but buyers are cautious. Belgian works are sold out up to October or November. Hongkong has bought wire nails at £17 2½s. (3.48c. per lb.) cost and freight. Japan has bought wire rods at £12 7½s. (\$56.43) cost and freight.

America has secured from Japan an order for 10,000 tons of 60 to 75-lb. rails, at a price not disclosed. Belgium had quoted £7 14½s. (\$35.22) f.o.b. on it.

In Belgium on Aug. 1 there were 39 blast furnaces blowing. The Société Anonyme des Forges de Clabecq is building a third furnace to cope with orders. Belgian output of pig iron is reported now at record volume since pre-war figures.

Tin plate is steady but there has been no substantial increase in demand. The recent oil-plate order now totals 400,000 boxes.

The Grovesend Steel & Tin Plate Co., Ltd., Gorseinon, Wales, has purchased the Duffryn, Mardy and Dynevor tin plate plants, at Duffryn, Gorseinon and Pantyffynon, respectively, in Wales, at a price of about £600,000 (\$2,730,000). The Grovesend steel capacity now is 6000 to 7000 tons per week, with 54 tin plate mills and 22 sheet mills.

Galvanized sheets are firm, but the demand is only moderate.

Black sheets are firm on Far Eastern buying. Negotiations are proceeding regarding the formation of a central selling agency for thin black sheets for Japan. All works except two are reported to have joined.

We quote per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at \$4.56 per £1, as follows:

Durham coke, delivered	£2 1½s.		\$9.46
Bilbao Rubio ore†.....	1 4		5.47
Cleveland No. 1 foundry	5 7½		24.51
Cleveland No. 3 foundry	5 1½	to £5 2s.	23.12 to \$23.25
Cleveland No. 4 foundry	4 16½		22.00
Cleveland No. 4 forge..	4 15	to 4 16	21.66 to 21.89
Cleveland basic	5 5		23.94
East Coast mixed.....	4 18	to 4 19	22.34 to 22.57
Ferromanganese	18 0		82.08
Ferromanganese*	18 10		84.36
Rails, 60 lb. and up...	8 10	to 9 10	38.76 to 43.32
Billets	8 5	to 8 10	37.62 to 38.76
Sheet and tin plate bars, Welsh	9 2½		41.61
Tin plates, base box...	1 3	to 1 3½	5.24 to 5.27
C. per Lb.			
Ship plates	9 10	to 10 0	1.93 to 2.04
Boiler plates	12 10	to 13 0	2.54 to 2.65
Tees	10 0	to 10 10	2.04 to 2.14
Channels	9 5	to 9 15	1.88 to 1.98
Beams	9 0	to 9 10	1.83 to 1.93
Round bars, ¾ to 3 in.	10 15	to 11 5	2.19 to 2.29
Galvanized sheets, 24 g.	18 15	to 19 0	3.82 to 3.87
Black sheets, 24 gage..	13 15		2.80
Black sheets, Japanese specifications	15 5		3.10
Steel hoops	12 0	& 12 10*	2.44 & 2.54*
Cold rolled steel strip, 20 g.	17 5		3.51
Cotton ties, Indian speci- fications	15 0		3.05

*Export price. †Ex-ship, Tees, nominal.

Continental Prices. All F. O. B. Channel Ports, Delivery as Specified

Foundry pig iron:			
Belgium	£5 5s.	to £5 7½s.	\$23.94 to \$24.51
France	5 5	to 5 7½	23.94 to 24.51
Luxemburg	5 5	to 5 7½	23.94 to 24.51
Billets:			
Belgium	7 5		33.06
France	7 5		33.06
Merchant bars:			
Belgium	8 0	to 8 5	1.63 to 1.68
Luxemburg	8 0	to 8 5	1.63 to 1.68
France	7 10		1.53
Joists (beams):			
Belgium	7 12½	to 7 15	1.55 to 1.58
Luxemburg	7 15		1.58
France	7 10	to 7 12½	1.53 to 1.55
Angles:			
Belgium	8 0	to 8 5	1.63 to 1.68
¾-in. plates:			
Belgium	8 15	to 9 0	1.78 to 1.83
¾-in. plates:			
Luxemburg	7 15		1.58
Belgium	7 10		1.53

Very Little Improvement in Pig Iron or Steel— Shipbuilding at Low Ebb

LONDON, ENGLAND, Aug. 9.—So far it is impossible to report any cheerful conditions. On account of the continued slow demand, Cleveland iron has been reduced further, and No. 3 is now quoted at 102s. 6d. per ton, while East Coast hematite ranges from about 98s. to 100s. The inevitable outcome of the slack demand and the difficulty in reducing costs of production is seen already in the fact that three furnaces have been damped down, while it is expected that before long a fourth will be added to the list of non-operative units. Trading conditions in regard to other makes of pig iron here are also very slow and, in the opinion of makers, this is the leanest period experienced for several years.

In manufactured iron and steel conditions show a little improvement. Of course, this is still more or less a holiday period in this country, but in Scotland the annual holiday is now over, and conditions there do not yet show much sign of returning activity, except perhaps in regard to sheets, for which, it is understood, some fair orders have been received from abroad.

Of course, the condition of the steel trade in the north largely hinges upon the position of the shipyards, and unfortunately output continues to be re-

tarded by the boilermakers' dispute. The position generally at Clyde yards is very discouraging. Apart altogether from the labor troubles, there is a lack of new business coming along, and a steady decrease of work on hand, so that, with the labor dispute on the top of this, the shipbuilding trade has been practically brought to a state of stagnation. It is a rather remarkable fact that not one vessel for commercial purposes was floated during the month of July—an unprecedented circumstance. The total launched came to only 754 tons and consisted of four small pleasure craft and a dredger. With the exception of last April, the figure is the lowest on record. It is rather interesting to note that during the past three months the tonnage of motor vessels being built in the United Kingdom increased by over 40 per cent, while that of steamers decreased 16 per cent.

No domestic iron ores were mined in Nova Scotia during 1922, but the British Empire Steel Corporation continued to operate its iron mines in Newfoundland. Shipments from Newfoundland during the year, which were about three times greater than those of the previous year, comprised 1,123,327 tons, of which 311,482 tons was shipped to Nova Scotia, the balance being exported to Europe.

Prices Finished Iron and Steel f.o.b. Pittsburgh

Carload Lots

Plates

Sheared, tank quality, base, per lb. 2.50c.

Structural Material

Beams, channels, etc., base, per lb. 2.50c.
Sheet piling 2.65c.

Iron and Steel Bars

Soft steel bars, base, per lb. 2.40c.
Soft steel bars for cold finishing \$3 per ton over base
Reinforcing steel bars, base 2.40c.
Refined iron bars, base, per lb. 3.25c.
Double refined iron bars, base, per lb. 4.85c. to 5.00c.
Stay bolt iron bars, base, per lb. 8.00c. to 8.50c.

Hot-Rolled Flats

Hoops, ordinary gages and widths, base, per lb. 3.15c.
Rands, base, per lb. 3.15c.
Strips, base, per lb. 3.00c. to 3.15c.
Cotton ties, per bundle of 45 lb. \$1.62

Cold-Finished Steels

Bars and shafting base, per lb. 3.25c.
Strips, base, per lb. 5.00c.

Wire Products

Nails, base, per keg \$3.00
Galvanized nails, 1 in. and over \$2.25 over base
Galvanized nails, less than 1 in. 2.50 over base
Bright plain wire, base, No. 9 gage, per 100 lb. 2.75
Annealed fence wire, base, per 100 lb. 2.90
String wire, base, per 100 lb. 3.70
Galvanized wire, No. 9, base, per 100 lb. 3.35
Galvanized barbed, base, per 100 lb. 3.80
Galvanized staples, base, per keg 3.80
Painted barbed wire, base, per 100 lb. 3.45
Polished staples, base, per keg 3.45
Cement coated nails, base, per count keg 2.70
Woven fence, carloads (to jobbers) .67 1/2 per cent off list
Woven fence, carloads (to retailers) .65 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads, .60 and 10 per cent off list
Machine bolts, small, cut threads, .50, 10 and 10 per cent off list
Machine bolts, larger and longer, .50, 10 and 10 per cent off list
Carriage bolts, 3/4 x 6 in.:

Smaller and shorter, rolled threads

Cut threads .50 and 10 per cent off list
Larger and longer .50 and 10 per cent off list
Lag bolts .60 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads .50 and 10 per cent off list
Other style heads .20 per cent extra
Machine bolts, c.p.c. and t. nuts, 3/4 x 4 in.:

Larger and longer sizes .45 and 10 per cent off list

Hot pressed square or hex. nuts, blank 3.75c. off list
Hot pressed nuts, tapped 3.75c. off list
C.p.c. and t. square or hex. nuts, blank 3.75c. off list
C.p.c. and t. square or hex. nuts, tapped 3.75c. off list
Semi-finished hex. nuts:

3/8 in. and smaller, U. S. S. .80 per cent off list
3/8 in. and larger, U. S. S. .75 per cent off list
Small sizes, S. A. E. .80 and 5 per cent off list
S. A. E., 3/4 in. and larger .75 and 5 per cent off list
Stove bolts in packages .75, 10 and 5 per cent off list
Stove bolts in bulk .75, 10, 5 and 2 1/2 per cent off list
Tire bolts .50, 10 and 10 per cent off list
Bolt ends with hot pressed nuts, .50, 10 and 10 per cent off list
Turnbuckles, with ends, 1/2 in. and smaller, .55 and 5 to 50 per cent off list
Turnbuckles, without ends, 1/2 in. and smaller, 70 and 10 to 65 and 5 per cent off list
Washers .5c. to 5.25c. off list

Cap and Set Screws

Milled square and hex. head cap screws .65 and 10 per cent off list
Milled set screws .65 and 10 per cent off list
Upset cap screws .75 per cent off list
Upset set screws .75 per cent off list
Milled studs .50 per cent off list

Rivets

Large structural and ship rivets, base, per 100 lb. \$3.00 to \$3.10
Large boiler rivets, base 100 lb. 3.10 to 3.20
Small rivets .65 and 10 to 65 and 5 off list

Track Equipment

Spikes, 3/8 in. and larger, base, per 100 lb. \$3.15
Spikes, 1/2 in., 3/8 in. and 3/4 in., per 100 lb. 3.50
Spikes, 3/8 in. 3.50
Spikes, boat and barge, base, per 100 lb. 3.50
Track bolts, 3/4 in. and larger, base, per 100 lb. 4.00 to 4.25
Track bolts, 1/2 in. and 3/4 in., base, per 100 lb. 5.00 to 5.50
Tie plates, per 100 lb. 2.55 to 2.60
Angle bars, base, per 100 lb. 2.75

Welded Pipe

Butt Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/8	45	19 1/2	3/4 to 3	22	+39
1/4	51	25 1/2	3/4	22	2
3/8	56	42 1/2	1 to 1 1/2	28	11
1/2	60	48 1/2		30	13
3/4	62	50 1/2			

Lap Weld

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
2 1/2 to 6	55	43 1/2	2	23	7
7 and 8	59	47 1/2	2 1/2	26	11
9 and 10	56	43 1/2	3 to 6	28	13
11 and 12	54	41 1/2	7 to 12	26	11
	53	40 1/2			

Butt Weld, extra strong, plain ends

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
1/4 to 3/8	41	24 1/2	2 to 3	61	50 1/2
1/2	47	30 1/2	3/4 to 3	+19	+54
3/4	53	42 1/2	1/2	21	7
1	58	47 1/2	3/4	28	12
1 to 1 1/2	60	49 1/2	1 to 1 1/2	30	14

Lap Weld, extra strong, plain ends

Inches	Steel Black	Galv.	Inches	Iron Black	Galv.
2	53	42 1/2	2	23	9
2 1/2 to 4	57	46 1/2	2 1/2 to 4	29	15
4 1/2 to 6	56	45 1/2	4 1/2 to 6	28	14
7 to 8	52	39 1/2	7 to 8	21	7
9 and 10	45	32 1/2	9 to 12	16	2
11 and 12	44	31 1/2			

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 per cent on black and 1 1/2 points, with a supplementary discount of 5 per cent, on galvanized.

Boiler Tubes

Lap Welded Steel	Charcoal Iron
2 to 2 1/4 in. 27	1 1/4 in. +18
2 1/4 to 2 3/4 in. 37	1 3/4 to 1 1/2 in. +8
3 in. 40	2 to 2 1/4 in. 2
3 1/4 to 3 3/4 in. 42 1/2	2 1/4 to 3 in. 7
4 to 13 in. 46	3 1/4 to 4 1/2 in. 9

Less carload lots 4 points less.

Standard Commercial Seamless Boiler Tubes

Cold Drawn	Hot Rolled
1 in. 55	3 and 3 1/4 in. 36
1 1/4 and 1 1/2 in. 47	3 1/4 and 3 3/4 in. 37
1 3/4 in. 31	4 in. 41
2 and 2 1/4 in. 22	4 1/2 in. and 5 in. 33
2 1/2 and 2 3/4 in. 32	
3 and 3 1/4 in. 38	
3 1/2 in. and 3 3/4 in. 39	

Less carloads, 4 points less. Add \$8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of net larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base .83 per cent off list
Carbon 0.30 to 0.40, base .81 per cent off list
Plus usual differentials and extras for cutting. Warehouse discounts range higher.

Seamless Locomotive and Superheater Tubes

Cents per Ft.	Cents per Ft.
2-in. O.D. 12 gage. 15	2 1/4 in. O.D. 10 gage. 20
2-in. O.D. 11 gage. 16	3-in. O.D. 7 gage. 35
2-in. O.D. 10 gage. 17	1 1/4 in. O.D. 9 gage. 15
2 1/4 in. O.D. 12 gage. 17	5 3/4 in. O.D. 9 gage. 55
2 1/2 in. O.D. 11 gage. 18	5 1/2 in. O.D. 9 gage. 57

Tin Plate

Standard cokes, per base box \$5.50

Terne Plate

(Per Package, 20 x 28 in.)

8-lb. coating, 100 lb. base \$11.00	20-lb. coating I. C. \$14.90
8-lb. coating I. C. 11.30	25-lb. coating I. C. 16.20
12-lb. coating I. C. 12.70	30-lb. coating I. C. 17.35
15-lb. coating I. C. 13.95	35-lb. coating I. C. 18.35
	40-lb. coating I. C. 19.35

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb. 3.00c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb. 3.75c. to 3.85c.

Automobile Sheets

Regular auto body sheets, base (22 gage), per lb. 5.35c.

Galvanized

No. 28 (base), per lb. 5.00c.

Long Ternes

No. 28 gage (base), 8-lb. coating per lb. 5.30c.

Tin-Mill Black Plate

No. 28 (base), per lb. 3.85c.

Manufacturers have pamphlets which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All freight rates from Pittsburgh on finished iron and steel products, carload lots, per 100 lb.:

Philadelphia, domestic \$0.32	Buffalo \$0.265	St. Louis \$0.43	Pacific Coast \$1.34
Philadelphia, export 0.235	Cleveland 0.215	Kansas City 0.735	Pac. Coast ship plates 1.20
Baltimore, domestic 0.31	Cleveland, Youngstown 0.19	Kansas City (pipe) 0.705	Birmingham 0.58
Baltimore, export 0.225	Comb. 0.29	St. Paul 0.60	Memphis 0.56
New York, domestic 0.34	Detroit 0.29	Omaha 0.735	Jacksonville, all rail 0.70
New York, export 0.255	Cincinnati 0.29	Omaha (pipe) 0.705	Jacksonville, rail and water 0.415
Boston, domestic 0.365	Indianapolis 0.31	Denver 1.27	New Orleans 0.67
Boston, export 0.255	Chicago 0.34	Denver (pipe) 1.215	

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 35c.; ship plates, 40c.; ingot and muck bars, structural steel, common wire products including cut or wire nails, spikes, and wire hoops, 40c.; sheets and tin plates, 40c.; sheets, No. 12 gage and lighter, 50c.; rods, 40c.; wire rope cable and strands, 45c.; wire fencing, netting and stretcher, 40c.; pipes not over 12 in. in diameter, 55c.; over 12 in. in diameter, 2 1/2c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Prices of Raw Materials, Semi-Finished and Finished Products

Ores

<i>Lake Superior Ores, Delivered Lower Lake Ports</i>	
Old range Bessemer, 55 per cent iron.....	\$6.45
Old range non-Bessemer, 51½ per cent iron.....	5.70
Mesabi Bessemer, 55 per cent iron.....	6.20
Mesabi non-Bessemer, 51½ per cent iron.....	5.55
<i>Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore</i>	
Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian.....	11¼c.
Iron ore, Swedish, average 66 per cent iron.....	10.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus, nominal.....	45c.
Manganese ore, ordinary, 48 per cent manganese, from the Caucasus.....	42c.
Manganese ore, Brazilian or Indian, nominal.....	42c.
Tungsten ore, per unit, in 60 per cent concentrates.....	\$8.50
Chrome ore, basic, 48 per cent Cr ₂ O ₃ , crude, per ton, c.i.f. Atlantic seaboard.....	\$18.00 to 28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS ₃ , New York.....	75c. to 85c.

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton.....	\$117.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port, duty paid.....	117.50
Spiegeleisen, domestic, 19 to 21 per cent, per ton, furnace.....	\$45.00 to 47.50
Spiegeleisen, domestic, 16 to 19 per cent, furnace, per ton.....	44.00 to 46.50
Ferrosilicon, 50 per cent, delivered, per gross ton.....	82.50
Ferrosilicon, Bessemer, 10 per cent, per ton, furnace.....	43.50
Ferrosilicon, Bessemer, 11 per cent, per ton, furnace.....	46.80
Ferrosilicon, Bessemer, 12 per cent, per ton, furnace.....	50.10
Ferrosilicon, Bessemer, 13 per cent, per ton, furnace.....	54.10
Ferrosilicon, Bessemer, 14 per cent, per ton, furnace.....	59.10
Silvery iron, 6 per cent, per ton, furnace.....	32.00
Silvery iron, 7 per cent, per ton, furnace.....	33.00
Silvery iron, 8 per cent, per ton, furnace.....	34.50
Silvery iron, 9 per cent, per ton, furnace.....	36.50
Silvery iron, 10 per cent, per ton, furnace.....	38.50
Silvery iron, 11 per cent, per ton, furnace.....	41.80
Silvery iron, 12 per cent, per ton, furnace.....	45.10
Ferrotungsten, per lb. contained metal.....	88c. to 90c.
Ferrochromium, 4 to 6 per cent carbon, 60 to 70 per cent Cr. per lb. contained Cr. delivered.....	12c.
Ferrochromium, 6 to 7 per cent carbon, 60 to 70 per cent Cr., per lb.....	11.50c.
Ferrovanadium, per lb. contained vanadium.....	\$3.50 to \$4.00
Ferrocobaltititanium, 15 to 18 per cent, per net ton.....	200.00

Fluxes and Refractories

Fluorspar, 80 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	\$22.00
Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, per net ton f.o.b. Illinois and Kentucky mines.....	23.50
Per 1000 f.o.b. works:	
Fire Clay:	
Pennsylvania.....	High Duty \$48.00 to \$51.00 Moderate Duty \$43.00 to \$46.00
Maryland.....	50.00 to 53.00 45.00
Ohio.....	45.00 to 47.00 40.00 to 43.00
Kentucky.....	45.00 to 47.00 42.00 to 45.00
Illinois.....	48.00 to 50.00 45.00 to 47.00
Missouri.....	48.00 to 50.00 38.00 to 43.00
Ground fire clay, per net ton.....	6.50 to 9.50
Silica Brick:	
Pennsylvania.....	42.00 to 45.00
Chicago.....	52.00
Birmingham.....	48.00
Ground silica clay, per net ton.....	10.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.).....	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.).....	40.00
Chrome Brick:	
Standard size, per net ton.....	50.00

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over.....	\$42.50
Rolling billets, 2-in. and under.....	42.50
Forging billets, ordinary carbons.....	47.50
Sheet bars, Bessemer.....	42.50
Sheet bars, open-hearth.....	42.50

Slabs.....	\$42.50
Wire rods, common soft, base, No. 5 to ¼-in.....	51.00
Wire rods, common soft, coarser than ¼-in.....	\$2.50 over base
Wire rods, screw stock.....	\$5 per ton over base
Wire rods, carbon 0.20 to 0.40.....	\$3 per ton over base
Wire rods, carbon 0.41 to 0.55.....	\$5 per ton over base
Wire rods, carbon 0.56 to 0.75.....	\$7.50 per ton over base
Wire rods, carbon over 0.75.....	\$10 per ton over base
Wire rods, acid.....	\$15 per ton over base
Skelp, grooved, per lb.....	2.40
Skelp, sheared, per lb.....	2.40
Skelp, universal, per lb.....	2.40

Finished Iron and Steel, f.o.b. Mill

Rails, heavy, per gross ton.....	\$43.00
Rails, light, new steel, base, per lb.....	2.25c.
Rails, light, rerolled, base, per lb.....	2.00c. to 2.15c.
Spikes, ½-in. and larger, base, per 100 lb.....	\$3.15
Spikes, ½-in., ⅞-in. and 1-in., base per 100 lb.....	\$3.25 to 3.75
Spikes, ⅞-in., base, per 100 lb.....	3.25 to 3.75
Spikes, boat and barge, base, per 100 lb.....	3.50 to 3.75
Track bolts, ¾-in. and smaller, base, per 100 lb.....	4.15 to 4.50
Track bolts, ¾-in. and larger, base, per 100 lb.....	4.75 to 5.50
Tie plates, per 100 lb.....	3.55 to 2.60
Angle bars, per 100 lb.....	2.75
Bars, common iron, base, per lb., Chicago mill.....	2.50c.
Bars, common iron, Pittsburgh mill.....	2.40c.
Bars, rails, steel reinforcing, base, per lb.....	2.15c. to 2.25c.
Ground shafting, base, per lb.....	3.65c.
Cut nails, base, per keg.....	\$2 25

S. A. E. Semi-finished Castellated Nuts and U. S. S. Semi-finished Slotted Nuts

(To jobbers and consumers in large quantities f.o.b. Pittsburgh)

	Per 1000	
	S. A. E.	U. S. S.
¼-in.....	\$4.80	\$4.80
⅜-in.....	5.50	6.00
½-in.....	6.50	7.00
⅝-in.....	9.00	9.50
¾-in.....	11.00	11.50
1-in.....	15.00	15.00
1¼-in.....	19.50	20.00
1½-in.....	23.50	23.50
1¾-in.....	37.00	37.50
2-in.....	58.50	60.50
2½-in.....	88.00	97.00
3-in.....	132.00	132.00
3½-in.....	176.00	176.00
4-in.....	220.00	220.00

Larger sizes—Prices on application

Alloy Steel

S. A. E. Series Numbers	Bars 100 lb.
2100* (½% Nickel, 10 to 20 per cent Carbon).....	\$3.25 to \$3.50
2300 (3½% Nickel).....	5.25 to 5.50
2500 (5% Nickel).....	7.75 to 8.00
3100 (Nickel Chromium).....	4.25 to 4.50
3200 (Nickel Chromium).....	6.00 to 6.25
3300 (Nickel Chromium).....	8.00 to 8.25
3400 (Nickel Chromium).....	7.00 to 7.25
5100 (Chromium Steel).....	3.75 to 4.00
5200* (Chromium Steel).....	8.00 to 8.25
6100 (Chromium Vanadium bars).....	5.00 to 5.25
6100 (Chromium Vanadium spring steel).....	4.75 to 5.00
9250 (Silico Manganese spring steel).....	3.75 to 4.00
Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium).....	5.25 to 5.50
Chromium Molybdenum bars (0.30—1.10 Chromium, 0.25—0.40 Molybdenum).....	4.50 to 4.75
Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum).....	4.25 to 4.50
Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum).....	4.25 to 4.50

Above prices are for hot-rolled alloy steel bars, forging quality, per 100 lb. f.o.b. Pittsburgh. Billets 4 x 4 in. and larger are \$10 per gross ton less than net ton price for bars of same analyses. On smaller than 4 x 4-in. billets down to and including 2½-in. sq. there is a size extra of \$10 per gross ton; on billets smaller than 2½-in. sq., the net ton bar price applies.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

STRUCTURAL STEEL BOOKED

July Contracting Practically at Rate of June but Two-thirds That of First Half

WASHINGTON, Aug. 20.—The Department of Commerce announces July sales of fabricated structural steel, based on figures received by the Bureau of Census. Total sales of 113,331 tons were reported for July by firms with a capacity of 224,640 tons per month.

Tonnage booked each month by 175 identical firms, with a capacity of 229,575 tons per month, is shown below, together with the per cent of shop capacity represented by these bookings. For comparative purposes the figures are also prorated to obtain an estimated total for the United States on a capacity of 250,000 tons per month.

1922	Actual Tonnage Booked	Per Cent of Capacity	Computed Total Bookings
April	200,588	87	217,500
May	184,638	81	202,500
June	168,498	73	182,500
July	157,631	69	172,500
August	156,011	68	170,000
September ..	146,146	64	160,000
October	132,450	58	145,000
November ..	111,794	49	122,500
December ..	138,024	60	150,000
1923			
January ...	172,415	75	187,500
February ..	183,938	80	200,000
March	218,997	95	237,500
April	185,335*	81	202,500
May	131,291*	57	142,500
June	116,609**	51	127,500
July	113,331***	50	125,000

*Reported by 174 firms with a capacity of 229,375 tons.

**Reported by 170 firms with a capacity of 228,160 tons.

***Reported by 156 firms with a capacity of 224,640 tons.

Railroads Figure in Structural Awards—Large Increase in Inquiries

With upward of 16,000 tons put under contract, including over 5000 tons for railroads and some 32,500 tons of new inquiries, the past week was a bright one in a relatively dull steel market. About half of the inquiries covered business buildings and dwellings and nearly as many were for school houses and other public buildings. The awards included the following:

Baltimore & Ohio, bridge, 250 tons, to Bethlehem Steel Bridge Corporation; several small bridges totaling 300 tons to Fort Pitt Bridge Works.

Southern Railway, viaduct in Virginia, 300 tons, to Virginia Bridge & Iron Works.

Philadelphia Inquirer, addition to building now under construction, 1000 tons, to American Bridge Co., which also has contract for about 6000 tons for main building.

Crescent Development Co., 500 tons for 50 houses to be built in Astoria, L. I., to unnamed fabricator.

Judd office building, Hartford, Conn., 450 tons, to Levering & Garrigues Co.

Public School No. 74, New York, 1600 tons, to A. E. Norton, Inc.

Chicago, Rock Island & Pacific Railroad, plate girder spans, 2535 tons, to American Bridge Co.

RAILROAD EQUIPMENT BUYING

Best Week in Two Months, But Immediate Future Not Promising

Purchases of 1300 cars and contracting for underframes and for general repairing as well as fresh inquiries for repairs and underframes make the past week a bright one in comparison with those of the last two months. Car builders have manufacturing facilities unscheduled for the last month or two of the year, with little promise that the immediate future will see that capacity pre-empted. The chief items of the week are:

New York Central has awarded 500 box car repairs to the Ryan Car Co. and 200 box car repairs to the American Car & Foundry Co.

Southern California Edison Co., shop buildings, Alhambra, Cal., 1980 tons, to Llewellyn Iron Works.

Oklahoma Gas & Electric Co., boiler house, Harrah, Okla., 1130 tons, to Kansas City Structural Steel Co.

Ford Motor Co., additional unit for plant at Iron Mountain, Mich., 700 tons, to Worden-Allen Co.

Public school building, Central Avenue and Grace Street, Chicago, 400 tons, to Vierling Steel Works.

Fiber Conduit Co. plant building, Richmond, Ind., 300 tons, to Insley Mfg. Co.

Great Northern Railroad, bridge trestle at Des Lacs, N. D., 920 tons, to Milwaukee Bridge Co.

Louisville & Nashville Railroad, bridge work, 450 tons, to American Bridge Co., and 400 tons, to Mount Vernon Bridge Co.

McCall Publishing Co., printing building, Dayton, Ohio, 500 tons, general contract to Frank Hill Smith, Inc.

Standard Oil Co., power house, Cleveland, 1700 tons, to the Massillon Bridge & Structural Co.

Nickel Plate Railroad, extension to machine shop at Stoney Island, Ill., 150 tons, to Fort Pitt Bridge Works.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Motor repair shop for City of New York, Avenue C and Sixteenth Street, 1200 tons.

City of New York, four school buildings in Manhattan and Brooklyn, 8000 tons.

Apartment buildings in New York, one on Sixty-seventh Street, 1500 tons; one 655 Park Avenue, 1200 tons; one on Ninety-sixth Street, 700 tons, and one on West Seventy-fourth Street, 700 tons.

American News Co. Building, Varick Street, New York, 400 tons.

Building for Sonn Brothers, New York, 1500 tons.

Roth loft buildings, one of 1200 tons and one of 800 tons, both to be built on Thirty-fifth Street, New York.

High school building, Hartford, Conn., 400 tons.

Hillside Coal & Iron Co., coal breaker at Pittston, Pa., 1200 tons.

Vanderbilt University, Nashville, Tenn., 400 tons.

Lakeshore Athletic Club Building, Chicago, 4500 tons.

Great Northern Railroad, ore docks, Duluth, Minn., 2300 tons.

Elks' Club Building, San Francisco, 1100 tons.

Legislative Building, Olympia, Wash., 1000 tons.

Court house and jail, Cedar Rapids, Iowa, 600 tons.

Certaineed Products Corporation, plaster mill, Grand Rapids, Mich., 300 tons.

Compania Carbonifero De Sabanas, crane runway, Rosita, Mex., 160 tons, bids being taken by Allen & Garcia, engineers, Chicago.

U. S. Engineers' Office, Louisville, Ky., will open bids Sept. 11 for nineteen steel barges, 110 x 26 x 6.5 ft., involving approximately 1500 tons of steel.

Hetch Hetchy water system, San Francisco, several small bridges, 1500 tons.

Great Northern Railroad, bridge work, 400 tons, new bids taken.

Masonic Temple, South Bend, Ind., 250 tons, bids taken.

The Chesapeake & Ohio is in the market for repairs on 1500 cars.

The Pere Marquette is inquiring for 300 to 500 underframes for refrigerator cars, which it will build in its own shops.

Swift & Co., Chicago, is in the market for 100 steel underframes for refrigerator cars.

The Erie is inquiring for 40 suburban coaches.

The Canadian National Railways have awarded 1000 box cars to the Pressed Steel Car Co.

The Pere Marquette has ordered 300 refrigerator cars from the Pressed Steel Car Co.

The New York, Chicago & St. Louis has closed for 100 steel underframes for box cars with the Pressed Steel Car Co.

The Long Island Railroad has asked authority of the Interstate Commerce Commission for issuance of \$1,710,000 in equipment trust certificates to purchase 40 motor passenger cars, 30 passenger cars, 20 trailers and two combination mail and baggage cars.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery							
Copper, New York			Straits	Lead		Zinc	
Aug.	Lake	Electro-lytic*	Tin New York	New York	St. Louis	New York	St. Louis
15.....	14.25	13.75	39.37½	6.70	6.40	6.65	6.30
16.....	14.25	13.75	39.37½	6.70	6.40	6.70	6.35
17.....	14.25	13.75	39.25	6.70	6.40	6.80	6.45
18.....	14.25	13.75	....	6.70	6.40	6.80	6.45
20.....	14.25	13.75	39.50	6.70	6.40	6.80	6.45
21.....	14.25	13.75	39.37½	6.70	6.45	6.80	6.45

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Aug. 21, 1923.

The markets continue quiet and featureless. Buying of copper has been a little more general but prices are lower. There has been very little activity in the tin market. Lead demand continues light with prices practically unchanged. Zinc is the strongest market and prices are quite a little higher.

Copper.—More buying of electrolytic copper is reported in the past week than in some time but the volume is not large as judged by normally active markets. Several million pounds were sold last week to domestic consumers and there are inquiries in the market for several million more. One seller characterizes the market as sustained by export sales, which have been fairly large recently to both England and France. The combined domestic and export sales have been of such a volume as to encourage copper producers and sellers, and it is believed by many that the present minimum price of 14c., delivered, is close to, if not actually, the bottom on this movement. The statistical position is considered healthy and the undertone, as exemplified by the prospects of consumers, is firm. Lake copper is quoted from 14.25c. to 14.37½c., delivered.

Tin.—The only active day in the Straits tin market the past week was on Aug. 15, on which sales of 300 to 400 tons are reported at 39.25c. to 39.50c. Most of the buying was done by dealers, although some tin plate makers are reported to have participated. On other days the market was dull and featureless. The quotation for spot Straits tin today was 39.37½c., New York, in a very quiet market. In London quotations today were about £4 per ton higher than a week ago, with spot standard quoted at £187, future standard at £188, and spot Straits at £190 10s. The strength of the London market is attributed to speculation and the advance has been based upon relatively small sales, there being no encouragement, because of business done on this side. Arrivals thus far this month have been 4570 tons, with 3902 tons reported afloat.

Lead.—Demand for lead is very moderate, with most of the sales apparently made by independent producers. The metal has sold at 6.45c., St. Louis, where the market is steady, with the New York market quoted at 6.70c. The leading interest continues to quote 6.50c., New York. There is no rush of orders, and there are indications that producers have not much metal for prompt shipment, with some of them sold out for September.

Zinc.—The chief interest in this market centers in the export possibilities, and some sales have already been made for shipment to England, the price there being more nearly in line with the price here, enabling such business to be done. Domestic demand continues very light. Other considerations which have caused the prime western market to advance recently are labor problems in the West, the continued high price of ore and the disinclination of producers to press for sales. Quotations today for prime western for August and September shipment are 6.45c. to 6.50c., St. Louis, and 6.80c. to 6.85c., New York.

Nickel.—Quotations for shot and ingot nickel are still 29c. to 32c. per lb., with electrolytic nickel sold at 32c. by the leading producers. In the outside spot market quotations for shot and ingot nickel are 29c. to 32c.

Antimony.—The market is somewhat easier with demand slack and wholesale lots of Chinese metal for early delivery quoted at 7.62½, New York, duty paid. Jobbing lots are quoted at 8c. to 8.50c. per lb.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by importers, when they can obtain it from foreign producers at 26.50c. to 27c., New York, duty paid. The leading domestic producer continues to keep its quotations unpublished.

Old Metals.—Business is very quiet and values are uncertain. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible.....	13.75
Copper, heavy and wire.....	12.75
Copper, light and bottoms.....	10.75
Heavy machine composition.....	10.75
Brass, heavy.....	7.75
Brass, light.....	6.50
No. 1 red brass or composition turnings..	9.00
No. 1 yellow rod brass turnings.....	7.50
Lead, heavy.....	5.75
Lead, tea.....	4.75
Zinc.....	4.75

Chicago

Aug. 21.—Copper has receded, while tin and lead have advanced. Copper producers are trying to stimulate sales and for the first time in months are quoting lower than brokers. Both lead and spelter are in a stronger position because of the shutting down of a number of smelters owing to labor trouble. The prices of used metals are unchanged. We quote in carload lots, Lake copper, 14.75c.; tin, 40.50c.; lead, 6.50c.; spelter, 6.30c.; antimony, 9c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 11.25c. copper bottoms, 9.50c.; red brass, 8.50c.; yellow brass, 6c.; lead pipe, 4.75c.; zinc, 4c.; pewter, No. 1, 20c.; tin foil, 24c.; block tin, 30c.; all buying prices for less than carload lots.

Buffalo Foundry & Machine Co. Acquires Chicago Company

The Buffalo Foundry & Machine Co., builder of the Bufflovak and Bufflokast vacuum drying and chemical apparatus, has taken over the interests of the Cannon-Swenson Co., Chicago, known to the sugar industry as consulting and contracting engineers. Martin J. Kermer, formerly the chief engineer and general manager of the Cannon-Swenson Co., is to remain in charge of the Chicago office with headquarters at 1636 Monadnock Block, as the accredited representative of the Buffalo Foundry & Machine Co. in the Chicago territory. He has had a wide experience in the field of general and chemical engineering and is regarded as an authority on sugar plant design and operation.

The policy of the Buffalo Foundry & Machine Co. in taking over this company and maintaining a Chicago office has been primarily to afford a closer cooperation with customers located in that territory.

Coke Production in July

WASHINGTON, Aug. 21.—The production of by-product coke improved slightly during July, according to the Geological Survey. The total output is estimated at 3,255,000 net tons, an increase of 89,000 tons over the figures for June. Reports from the 69 plants now in existence show that 64 were active and five were idle. The output from the active plants was 87.1 per cent of the total capacity of all plants.

Unlike by-product coke, the production of beehive coke continued to decline steadily and the output was 1,582,000 tons against 1,755,000 tons in June. This was a decrease of 173,000 tons, or nearly 10 per cent and the rate of production was less than the monthly average in any recent year except 1921 and 1922.

The total output of all coke in July was 4,837,000 tons, against 4,921,000 tons in June. Thus it is seen that in spite of the decrease at beehive ovens, the rate of production of all coke exceeds the average monthly rate during the years for which such records are available.

PERSONAL

J. P. Moses of Joseph T. Ryerson & Son, Inc., has been appointed general manager of railroad sales, with offices in Chicago, to succeed H. A. Gray, who has resigned to enter another field of business. Mr. Moses has been with the firm of Joseph T. Ryerson & Son,



J. P. MOSES



H. T. BRADLEY

Inc., for over twenty-two years, and is well known in railway circles. For years he has specialized in a refined iron, known as Ulster Special, used largely by the railroads for staybolt purposes. H. T. Bradley, who has been serving the railroad field for many years in the East, has been appointed manager of Eastern railroad sales, with offices in New York. Mr. Bradley came with the Ryerson company in 1906 and spent a great deal of his time as a sales engineer in its machinery department. For the past seven years, however, he has been associated with the railroad division as assistant manager. Although the Ryerson company sells a complete line of iron and steel products to the railroads, he has concentrated his efforts largely on staybolt iron and special railroad machinery.

Eugene L. Beisel, formerly with the Reeve-Fritts Co., Chicago, has become associated with Charles H. Besly & Co., Chicago, and will further the interests of his company in the States of New York and Pennsylvania, with headquarters at 79 Norwalk Avenue, Buffalo, N. Y.

Robert S. Beecher, formerly manager of the stone-ware department of the General Ceramics Co., has been made sales manager for the George F. Hurt Engineering Corporation, New York.

A. E. Tiffault, formerly with the American Sheet & Tin Plate Co., Pittsburgh, and Raymond I. Caspers, formerly with the Illinois Steel Co., have been placed in charge of the Chicago office of the Surplus Steel Exchange, Inc., New York, with quarters at 2257 Oakdale Avenue, Chicago.

E. H. Yetter has been appointed general superintendent of the Zanesville works of the American Rolling Mill Co. He had been employed in the Middletown works of the company for a number of years. In the World War he served as a first lieutenant of infantry and participated in the Piave campaign in Italy.

H. D. Jenkins has been appointed sales representative of the Mahoning Valley Steel Co., manufacturer of steel sheets, Niles, Ohio, with office in the Otis Building, Chicago. Until 1917 he was Western sales manager of the Sandusky Cement Co., with headquarters at Chicago, and since that time has been a manufacturer's agent and steel jobber at Chicago.

William B. Gillies has been named district manager of the Chicago district of the Youngstown Sheet & Tube Co. He was formerly works superintendent of

the Indiana Harbor plant of the Steel & Tube Co. of America. In his new capacity he will have charge of the properties at Indiana Harbor, South Chicago, Evanston, Ill., and Kalamazoo, Mich. The other district of the Youngstown Sheet & Tube Co. is the Youngstown district, of which E. T. McCleary, formerly assistant general superintendent, is general manager.

James Holihan, who was for years connected with Frank Briscoe in the Briscoe Mfg. Co., will be in charge of sales at Detroit for the General Accessories Co., Pontiac, Mich., recently organized by Mr. Briscoe.

M. D. Hopkins, who represented the Angelus Sanitary Can Machine Co., Los Angeles, in Middle Western territory, will represent the Max Ams Machine Co., New York, in Chicago after Sept. 1, with headquarters at 20 East Jackson Boulevard.

H. O. Pond has been appointed vice-president and general manager in charge of automobile painting and refinishing of the United Finishing Co., Third and Grand Streets, Hoboken, N. J.

A. L. Kern has resigned his connection with the Richards-Wilcox Mfg. Co., Aurora, Ill., as efficiency and developing engineer. As yet he has not made any definite plans for the future.

F. J. Winder has been made manager of the Pittsburgh district of the Surface Combustion Co., with offices at 927 Union Arcade Building, Pittsburgh. A. J. Euston will have charge of the Buffalo district, with headquarters at 45 Andrews Building, Buffalo.

Hollinshead N. Taylor, president N. & G. Taylor Co., manufacturer of tin plate, Philadelphia, has returned from a motor trip through southwestern England and the Welsh tin plate district.

Guy W. Vaughan has resigned as operating head of the Marlin-Rockwell group and president of Standard Steel & Bearings, Inc., effective Aug. 1, to become interested in other undertakings. He joined the Marlin-Rockwell Corporation two years ago as vice-president and general manager of Standard Steel & Bearings, Inc., and shortly after became vice-president and operating head of the entire group.

James A. Stairs has joined the staff of the Calorizing Co. at the home office, Pittsburgh, to assist in the development of calorized tube recuperators. He was previously associated with E. L. McGary in consulting engineering work and during that time had charge of early installations of open-hearth furnaces and mills for the Sharon Steel Hoop Co., Sharon, Pa. From 1904 to 1909 he was superintendent of rolling mill for the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia, and was vice-president and superintendent of the Brown Machine Co., Ltd., at New Glasgow until 1918, when he became general superintendent of the Harroun Motor Corporation, Wayne, Mich.

D. L. Santee has resigned as manager of the Sharon Pressed Steel Co., Sharon, Pa., and will enter business in East Liverpool, Ohio.

John P. O'Connor, associated with E. C. Atkins & Co., Indianapolis, manufacturers of steel saws, at Seattle, Wash., for many years, has been appointed manager of the Seattle branch.

Caleb Davies has been appointed assistant general superintendent of the Republic Iron & Steel Co., Youngstown. He will be assistant to Peter Gordon, general superintendent. He has been superintendent of the company's by-product coke department. R. B. Marshall, previously assistant superintendent of the coke works, has been advanced to superintendent.

Albert W. Zahniser, formerly manager of the schedule department of the Midvale Steel & Ordnance Co., has become connected with the sales department of the Eastern Steel Co. in its office in the Pennsylvania Building, Philadelphia.

J. F. Hinterleiter has been appointed manager of the coal department of the Debevoise-Anderson Co., New York.

OBITUARY

FREDERICK N. BEEGLE, president Union Drawn Steel Co. and the Standard Gauge Steel Co., Beaver Falls, Pa., died at the Beaver Valley General Hospital, New Brighton, Pa., Aug. 17.



F. N. BEEGLE

He was taken sick on Tuesday, Aug. 14, complaining of a severe pain in his side. Pneumonia later developed and was the immediate cause of his death. Mr. Beegle was born in Millersburg, Ohio, May 21, 1860, and went to Beaver Falls in 1880 to enter the employ of the Hartman Steel Co., which later was absorbed by the Carnegie Steel Co. In 1899 he became associated with the Union Drawn Steel Co. as assistant superintendent and moved up to the head of that company. When the Union Drawn Steel Co. took over

the Standard Gauge Steel Co. a few months ago Mr. Beegle became president of that company. He was president of the Beaver County Clay Co., Beaver Falls; vice-president of the First National Bank, Beaver Falls; a director of the Bank of Pittsburgh, Pittsburgh; a member of the board of trustees of the Beaver County Home for the Aged and the Beaver County Children's Home, and was a member of the Beaver Valley Country and Tamaqua clubs, Beaver Falls, and the Duquesne and Americus clubs, Pittsburgh. He is survived by Mrs. Beegle and one son, Clifford Beegle, who is connected with the Union Drawn Steel Co.

THOMAS ELLIS BROWN, for 27 years chief engineer of the Otis Elevator Co. and for the last 10 years chief consulting engineer of the company, died suddenly of heart disease at Morristown, N. J., Aug. 15. He was born in New York 67 years ago. He attended the School of Mines, Columbia University, and was assistant to Professor Fhunk on railroad and topographic surveys. Subsequently he was assistant engineer on New York elevated railroad structures and had charge of design and construction of the Ninth Avenue elevated structure. The original elevator in the Eiffel Tower was designed by Mr. Brown. He developed high-speed elevators, designed several incline railways and perfected the Brown Bascule or movable bridge. At the time of his death he was active in the Century and Engineers' clubs, New York, the American Institute of Consulting Engineers and the American Institute of Mining and Metallurgical Engineers.

WILLIAM D. SWAN, for 37 years general superintendent of the American Tube Works, Somerville, Mass., died Aug. 17 at his home in Swampscott, Mass. He was born in Acton, Mass., Nov. 2, 1851.

WILLIAM WILLIAMS, works manager of the mills of Interstate Iron & Steel Co. at East Chicago, Ind., died following an apopleptic stroke at his home, Aug. 20.

The Champion Engineering Co., Kenton, Ohio, builder of electric overhead cranes, a controlling interest in which was held by the Dollings Co., Columbus, Ohio, has been forced by the failure of the holding company to close down permanently. It is reported that the orders on which the Champion company had begun work have been taken over by a well-known crane builder for completion.

A competitive examination for an assistant Patent Office examiner is to be held Oct. 4, 5 and 6 by the United States Civil Service Commission, Washington.

Middle Man Service in Contract Work

The placing of contract work for certain kinds of manufactured metal products is only an occasional occurrence for the average organization, and often there is difficulty in finding those shops which can do the work best and most economically. Sources of information in published lists and catalogs are, as a rule, of a general character and do not indicate the nature of the equipment contained in a plant or specifically the kind of work for which it is best adapted. An organization may be listed as "machinist and founder," but this will not indicate to the prospective purchaser whether the company undertakes large or small work, or its capacity, or the current condition of its bookings.

Believing that there is a place in the metal industry for a broker who will bring together the buyer and seller of contract work, the H. M. Harper Co., First National Bank Building, Chicago, started business early last spring. At first it operated as an unincorporated organization, but recently has taken out a corporate charter. The company keeps in touch with a large number of manufacturers in the metal industry. The character of the equipment and the facilities of each are catalogued, and in addition the organization has become familiar with the managements of these companies and the kind of work they are best fitted to undertake. By continuously keeping in touch with this clientele, definite knowledge is obtained as to the deliveries and prices available on various classes of work.

That there is a place for service of this character is indicated by the company's experience up to date. Inquiries and orders received have come from companies with ratings averaging \$500,000. Although the Harper company is located in Chicago, as many inquiries have been received east of Lake Erie as west. All prices quoted to the buyer are net from factory. The commission obtained by the Harper company is paid by the manufacturer obtaining the business. H. M. Harper, organizer of the company, has been engaged for several years in the manufacturing end of the metal industry.

For the Foundrymen's Meeting at Paris

Indications are that the delegation of American foundrymen and representatives of foundry equipment firms in attendance at the Paris convention of Sept. 12 to 15 will number 25 persons. In addition to the names already given in THE IRON AGE, the following appear on the list most recently compiled: C. Earnill, assistant superintendent Fay & Scott, Dexter, Me.; L. Sexton Lehmann, S. B. Sexton Stove & Mfg. Co., Baltimore; W. E. Dunn, Jr., secretary Southern Metals Trades Association, Atlanta, Ga.; W. H. Nicholls, president W. H. Nicholls Co., Inc., Brooklyn; James Linklater, superintendent Michigan Malleable Iron Co., Detroit; Robert E. Turnbull, Chicago representative Arcade Mfg. Co., Freeport, Ill.; August Van Lantschoot, metallurgist, Iowa Malleable Iron Co., Fairfield, Iowa; Peter J. Krentz, works manager, Buffalo Foundry & Machine Co., Buffalo; George H. Kramer; Ralph H. West, West Steel Casting Co., Cleveland.

Sheet Sales Lowest in Eighteen Months

PITTSBURGH, Aug. 21.—Dependence of customers of independent sheet makers upon deliveries on old orders rather than upon fresh purchases is well illustrated in the monthly report of the National Association of Sheet and Tin Plate Manufacturers for July. This report shows total sales for July of 92,358 net tons, the smallest tonnage booked in relation to capacity for any month since January, 1922. Sales for July were about 80,000 tons less than those for June and 150,000 tons less than those of May. Shipments last month exceeded sales by about 100,000 tons and there was a like reduction in the unfilled orders. Net obligations of those makers reporting as of Aug. 1 were given as 263,738 tons.

JAPAN BUYS RAILS

Eleven Thousand Tons Awarded to Leading Independent—Frog and Switch Inquiries— Tin Plate for Japan

NEW YORK, Aug. 21.—Foreign inquiry continues active, particularly from Far Eastern markets, but the volume of actual business transacted, except from Government sources, is still small. The extended deliveries now being offered by United Kingdom mills on light gage black sheets have undoubtedly turned many inquiries for this product back to the American market, but quotations of American sellers are not much better than the British offers, with the leading interest out of the market for export and prices several dollars per ton higher.

The demand for wire rods continues active, but much of this business is reported going to foreign sellers, particularly to Canada. China is still looking for wire shorts and has inquired for some small lots of tin plate. Welsh tin plate makers continue to book orders in the Japanese market. The latest purchase of the Nippon Oil Co. totaled 60,000 boxes of tin plate, awarded to Iwai & Co., of which 40,000 boxes is understood to have been placed with an American independent interest and 20,000 boxes with a British maker. A number of small

inquiries, ranging from 500 to 1000 boxes or more, are reported current.

Iwai & Co. also were awarded the contract on the 11,160 tons of 60 and 75-lb. rails and splice bars purchased by the Imperial Government Railways, bids on which opened Aug. 15, and is understood to have placed the business with the leading independent interest in this country. The Imperial Government Railways are receiving bids on another tender for rails, calling for about 1100 tons of special lengths, 65 and 100-lb. sections, bids on which opened Aug. 20.

Purchase of 30 sets of manganese steel frogs and switches included in a tender issued by Osaka municipality, is reported to have been postponed on the ground that bids submitted were too high. The South Manchuria Railway Co. will open bids on Sept. 8 on 130 sets of manganese steel frogs and switches. Additional business in this equipment is in prospect from the Chilian State Railways with New York office at 141 Broadway. Specifications on about 40 manganese steel crossings will be issued through the New York office in about a week. The State railroad shops are equipped to fabricate the switches in Chile.

An inquiry upon which bids have been submitted by a few Japanese export houses is from Dai Nippon Sato Boeki Kaisha (Nippon Sugar Refining Co.), Tokio, Japan, and calls for about 2000 tons of structural steel for a new sugar refinery.

FRENCH MARKET STEADY

Prices Unchanged, with Few Concessions Reported—Ruhr Coke Receipts Improve Slightly

PARIS; FRANCE, Aug. 6.—The market in France continues steady. There has been but little activity in inquiry from the domestic market, although a slight improvement is generally reported. Prices have not been increased. Pig iron continues firm, with no prospect of concession. Export business has been satisfactory as a result of the depreciation of the franc, but, on the other hand, manufacturers are paying a higher price for imported raw materials.

Coke.—As was foreseen, only 70,000 tons of Ruhr coke was received in July, against 161,000 tons in June. Since the last days of July and the beginning of August, however, arrivals have been better and from Aug. 1 to 6 about 25,000 tons of coke have been received. If this increase continues it is hoped to avoid any further purchasing of British and American cokes.

The occupation authorities have decided to resume operation of certain ovens abandoned by the Germans, as sufficient supplies of coking smalls and labor are assured. If supplies from the Ruhr continue at the same rate as last week it is hoped that an increase in price for September will be avoided.

Iron Ores.—Normal movement of iron ores has not been resumed and there are still considerable stocks to be utilized. Prices are as follows: Thionville, 12.50 fr.; Briey, 15 to 16 fr.; Longwy, silicious, 11.50 to 12 fr.; Normandy iron ore, 35 fr.; and hematite of the Pyrenees, 30 to 32 fr.

Pig Iron.—In an effort to accumulate stock to tide over a shortage, buyers are placing deferred shipment orders. Inquiry for immediate consumption is small. Prices are firm, No. 3 P.L. chill cast foundry iron, 2½ to 3 per cent silicon, is quoted at 390 to 395 fr., according to tonnage, and 10 fr. lower for the P. R. Pig iron, 3 to 3½ per cent silicon, is quoted at 400 fr. The Association Cooperative des Fondateurs has established its price for July at 380.70 fr. per ton, against 373.55 fr. in June. For export Lorraine works have quoted casting pig iron at 395 to 400 fr. per ton and basic Bessemer iron at 385 to 390 fr., f.o.b. Antwerp.

On July 1, 106 blast furnaces were actively in blast in France, including 71 in the East and Lorraine areas, compared with:

January	116
February	90
April	77
May	88
June	99

Of the remaining furnaces 48 are being repaired and 64 are in condition to be blown in. The total output of pig iron in June amounted to 447,000 metric tons, of which 152,000 tons was from Lorraine. The June output showed an improvement of 54,000 tons over May, but a deficiency of about 66,000 tons from December, 1922.

Semi-Finished Steel.—Mills are well booked for two months in advance. Lorraine prices are about equal to those of the Nord and Pas-de-Calais, especially in basic steel. Export has been good lately. Prices have been increased again and basic material is quoted as follows per 100 kg.:

	Fr. Domestic	Fr. f.o.b. Antwerp
Ingots	48 to 49	50 to 52
Blooms	49 to 53	53 to 55
Billets	53 to 57	56 to 57
Largets	58 to 60	

In June a total of 427,000 metric tons of steel was produced, including 139,000 tons from Lorraine. This included 417,000 metric tons of ingots and 10,500 metric tons of castings. The June output was 39,000 tons higher than that of May and 13,000 tons lower than that of December, 1923.

Rails.—As some rolling mills are operating again, an increase in production is noticed, and a decline in price is expected. A mill in the Northeast recently quoted 513 fr. per ton on a tonnage of standard rails.

Rolled Steel Products.—There is a good current of orders and prices are steady, although slight concessions are still being made, as in a recent order for 100 tons placed at 55 fr. per 100 kg. Bars are quoted at 63 to 64 fr. in the North, round iron at 61 fr. in the East, and plates at 62 to 63 fr. In Lorraine, the base price ranges from 57 to 62 fr. per 100 kg. For export Lorraine steel products are quoted at about 610 fr. per metric ton (French currency). Hoops are being quoted at 80 to 82 fr., at mills, in the East and wire rods at 74 to 76 fr. per 100 kg.

Sheets.—Business is quiet and prices remain on the same level. Heavy plates are quoted for domestic consumption at 64 to 66 fr. per 100 kg.; heavy sheets at 65 to 70 fr.; medium sheets at 75 to 80 fr., and light sheets at 93 to 97 fr. per kg.

Iron and Steel Tubing.—Since the war France has become a larger producer of iron and steel tubing, and controls 60 per cent of the Mannesmann Works Co. in the Sarre. An active campaign has been instituted urging the substitution of iron and steel pipe for cast iron and non-ferrous metal tubing. For export, there has been active business lately, especially with South American countries.

Machinery Markets and News of the Works

PERE MARQUETTE BUYS

Michigan Road Places Large Orders for Machine-Tool Equipment

Buying by Industrial Companies Remains Exceedingly Light in All Sections

The Pere Marquette Railroad has closed for a considerable number of machine tools for its shops in Michigan. The orders were placed last week at Detroit. One Eastern machine-tool company received an order for 18 large machines and a number of small tools. It is believed the road's purchases will total \$200,000 or more.

The Elgin, Joliet and Eastern Railroad has completed its buying at Chicago, its whole list costing in the neighborhood of \$100,000. The Central Railroad of

New Jersey has authorized the purchase of a dozen or more tools recently inquired for and orders are expected shortly. The Baltimore & Ohio is preparing a list of tools, which will probably be sent out for bids soon. Several tools are being inquired for by the American Locomotive Co.

These are the high spots of railroad purchasing, which continues as the most important feature of machine-tool activity. Industrial companies are buying very little, and present indications are that August will be the poorest month of the year so far for many machine-tool dealers and builders.

The number of inquiries now being quoted on is not large, but a good deal of the business in prospect promises to develop into orders in September, and from this the trade takes some encouragement that a slightly better demand may be expected in the fall.

New York

NEW YORK, Aug. 21.

RAILROAD business continues as the only outstanding feature of Eastern machine tool markets. An Eastern machine tool builder has received an order from the Pere Marquette Railroad for the following machines: Three 5-ft. radial drills, one rod borer, one 42-in. vertical milling machine, one 36-in. slab milling machine, one 53-in. boring and turning mill, one 44-in. boring and turning mill, one 36-in. planer, one 100-in. tire boring and turning mill, one locomotive axle journal turning lathe, one 1500-lb. steam hammer, one of 2500 lb. and another of 6000 lb. capacity, three axle lathes, one plate flanging clamp. There were also a number of smaller machines, such as lathes, milling machines and shapers. The Baltimore & Ohio Railroad, it is reported in the trade, will soon issue a fairly large inquiry for tools and the Central Railroad of New Jersey is expected to send out orders within a week or so for the machines it recently inquired for, formal approval of the purchase having been made by the officials of the road. The demand for tools by industrial companies continues light in volume.

The New York Central Railroad Co., C. S. White, Room 344, 466 Lexington Avenue, purchasing agent, will receive bids until Aug. 30 for one 20,000-kw. turbo-generator and surface condenser for installation at the Port Morris power station, as specified in serial contract No. 24-1923.

The American Ammunition Co., Mosler Building, Guadalajara, Jalisco, Mexico, has inquiries out for machinery for making brass shells for various kinds of ammunition; also, the company is in the market for cartridge-loading machinery.

The Wheeler Salvage Co., 224 Bush Street, Brooklyn, has inquiries out for pumping equipment for fuel oil service; also, for steel tanks to operate at 100-lb. pressure.

Ovens, power equipment, conveying apparatus and other mechanical equipment will be installed in the new baking plant to be erected at 506-10 East Seventy-sixth Street, New York, by the Pink Bread Co., 438 East Seventy-second Street, estimated to cost \$85,000. L. S. Beardsley, 116 West Thirty-ninth Street, is architect.

Fire destroyed a portion of the plant of the Panther Motor Co., Inc., 481 Vernon Avenue, Long Island City, with loss estimated at \$300,000, including equipment. It is planned to rebuild.

The Seneca Copper Corporation, 120 Broadway, New York, operating properties in Keweenaw County, Mich., has arranged for a bond issue of \$1,000,000, a portion of the proceeds to be used for extensions and improvements. A merger has been perfected with the Gratiot Mining Co., with plant in the same district, under the Seneca name. Thomas F. Cole is president.

Bids will soon be asked by the Department of Works,

Borough of Richmond, Borough Hall, West New Brighton, for the construction of an automobile service and machine repair shop on the Clove Road, near Castleton Avenue, for municipal motor trucks and cars.

The International General Electric Co., 120 Broadway, New York, has taken a contract from the Paulista Railway, Brazil, for the electrification of 38 miles of line at a cost of \$1,000,000, including equipment, completing the system from Tatu to Jundiahy, about 63 miles.

The Board of Water Supply, Mount Vernon, N. Y., has acquired property at Oak and North West Streets, West Mount Vernon, heretofore used as a factory site, and plans for the installation of a new electrically operated pumping plant for booster service for the municipal waterworks.

Electric power equipment, conveying machinery and other mechanical equipment will be installed in the four-story distributing plant to be erected on Third Avenue, Brooklyn, by the Borden's Farm Products Co., 110 Hudson Street, New York, estimated to cost \$350,000, with machinery.

Fire, Aug. 12, destroyed two mechanical repair shops at the West Albany, N. Y., yards of the New York Central Railroad Co., Grand Central Terminal, New York, with loss estimated at \$70,000, including equipment. It is proposed to rebuild.

The Saranac River Power Corporation, Plattsburg, N. Y., recently formed with an active capital of \$200,000, plans for the construction of a power plant and steel tower transmission system for neighboring service. The company is headed by C. H. Allen and A. J. Eckert. Dunmore Ferrus & Dewey, Utica, N. Y., are representatives.

The Cities Service Co., 60 Wall Street, New York, has acquired the plants and properties of the Citizens' Light & Power Co. and the Lenawee Gas & Electric Co., both operating in the vicinity of Adrian, Mich., for a consideration stated at \$1,000,000. Plans are being arranged to merge the properties, including extensions and improvements for greater capacity.

The Empresas Electricas Asociadas of Lima, Peru, has disposed of bonds in an amount of about \$7,000,000, a large portion of the proceeds to be used for extensions and improvements in the local light and power plants and system, including the installation of additional generating machinery and auxiliary equipment.

The Thew Shovel Co., 30 Church Street, New York, with headquarters at Lorain, Ohio, manufacturer of gasoline and electric power excavating shovels, is arranging an expansion program at its plant, to include the acquisition of additional property for the erection of new buildings.

The Nassau Smelting & Refining Works, Ltd., 603 West Twenty-ninth Street, New York, has awarded contract for the erection of a new plant at Tottenville, S. I., to cost in excess of \$50,000.

The State Government, Bolivia, South America, is planning for the construction of locomotive and car repair shops in connection with the building of a new standard gage rail-

The Crane Market

PRICE seems to be the question of paramount importance in sales of both overhead and locomotive cranes. Competition is extremely keen and purchasing has slackened somewhat. A fair volume of business is still pending. The order of the Brooklyn Edison Co., Brooklyn, N. Y., for a 25-ton overhead traveling crane was probably placed this week and the two 15-ton special overhead cranes for the Railway Steel Spring Co., 30 Church Street, New York, is also reported closed.

Among current inquiries is one from Okura & Co., 50 Church Street, New York, for a 105-ton, 49-ft. span, 4-motor overhead traveling crane with 20-ton auxiliary for export to Japan. The New Jersey Zinc Co., Chrome, N. J., is receiving bids on an 8000-lb. monorail hoist. The Fitzgibbons Boiler Co., 47 West Forty-second Street, which originally inquired for a 20-ton, 23-ft. 8-in. span electric traveling crane, either new or used, and later reduced the specifications to a 15-ton crane, has revised its inquiry to a standard 10-ton, 23-ft. 8-in. span electric traveling crane. The General Electric Co., Schenectady, N. Y., is considering revised prices on two 10-ton overhead cranes inquired for several weeks ago and postponed at the time to await the necessary appropriation.

One of the large locomotive crane inquiries still pending is that of the American Telephone & Telegraph Co., New York, for three locomotive cranes of 15 to 20 tons capacity. In the bids on a 15-ton, 55-ft. span, 4-motor, overhead traveling crane, opened Aug. 15 by the United States Bureau of Yards and Docks, for Puget Sound Navy Yard, the Pawling & Harnischfeger Co. is reported as low bidder. The 31 small single I-beam hand-power cranes recently inquired for by a Japanese buyer are reported to have been placed with Herbert Morris in England. Among recent purchases are:

Isbell-Porter Co., 46 Bridge Street, Newark, N. J., a 20-ton locomotive crane for the Iroquois Gas Co., Buffalo, N. Y., from the Brown Hoisting Machinery Co.

E. R. Clark Management Corporation, Columbus, Ohio, a 50-ton, 50-ft. span, 3-motor overhead crane for the Tennessee Utilities Corporation, from the Cleveland Crane & Engineering Co.

Pennsylvania Railroad, Philadelphia, Pa., eastern region, eleven 1000-lb. and one 2000-lb. electric pillar cranes and twenty 1000-lb. and one 2000-lb. electric jib cranes, from the Whiting Corporation.

American-La France Fire Engine Co., Elmira, N. Y., a 10-ton, 17-ft. 3½-in. span electric traveling crane, from the Bedford Foundry & Machine Co., through Philip T. King, 30 Church Street, New York.

Chesapeake & Ohio Railway Co., Richmond, Va., a 20-ton locomotive crane, from the Industrial Works.

American Brake Shoe & Foundry Co., West Mahwah, N. J., a 20-ton locomotive crane, from an unnamed builder.

Warren Webster & Co., Camden, N. J., a 20-ton and a 1½-ton hand power cranes and a 3-ton electric traveling crane, from Maris Brothers.

Electric Power & Equipment Co., Philadelphia, a 1-ton, double I-beam crane with electric hoist, from Maris Brothers.

John Robertson & Co., Brooklyn, N. Y., a 25-ton electric hoist to operate on a double I-beam crane.

Indiana Electric Co., Indianapolis, Ind., a 30-ton, 30-ft. span overhead traveling crane and a 20-ton stationary hoist for power station service, from the Northern Engineering Works.

Studebaker Corporation, Detroit, Mich., a 4-ton electric transfer crane, from the Northern Engineering Works.

Steel Car Forge Co., Ellwood City, Pa., a 10-ton, 80-ft. span crane, from the Shaw Electric Crane Co.

Illinois Electric Power Co., a 75-ton, 4-motor, overhead traveling crane for Peoria, Ill., from the Whiting Corporation.

road from Cartagena to a connection with an existing line at Antioquia, about 300 miles. American equipment will be used, as well as American contractors for the construction of the road. Alfred L. Cameron, 49 Garden Place, Brooklyn, N. Y., attorney, is acting as local representative for the project.

The Board of Education, Asbury Park, N. J., is planning for the establishment of a vocational training school, in co-operation with the State Board of Institutions and Agencies, Bureau of Vocational Training, Trenton. It is proposed to use existing school property and have the department ready for service in October. The State Board also has tentative plans for the installation of vocational departments in present schools at Long Branch and Red Bank.

The Public Service Electric Corporation, Public Service Terminal, Newark, is awarding contracts for primary equipment for its new generating plant on the Hackensack River, Kearny, N. J., to cost in excess of \$10,000,000, and will place orders for miscellaneous electrical and mechanical equipment in the near future. Fifteen watertube boilers, each with capacity of 2300 hp., will be furnished by the Babcock & Wilcox Co., Bayonne, N. J.; nine fifteen-retort stokers have been ordered from the Sanford-Riley Stoker Co., Worcester, Mass., and six sixteen-retort stokers from the American Engineering Co., Philadelphia; two surface condensers, totaling 50,000 sq. ft. surface, will be supplied by the Allis-Chalmers Co., Milwaukee, which will also furnish eighteen 15,000-kva., 132-volt power transformers. The power station will be built by the Public Service Production Co., an affiliated organization. N. A. Carle is chief engineer, in charge of purchases.

Officials of the Lehigh Coal & Navigation Co., 437 Chestnut Street, Philadelphia, have organized a subsidiary to construct and operate a new plant at Perth Amboy, N. J., for the manufacture of anthracite coke for domestic service. A tract of 15 acres of land has been purchased, adjoining the works of the National Fireproofing Co., on the Raritan River, and work will commence on the initial plant unit, to cost in excess of \$50,000, with machinery. It is expected to be ready for operation in November. A power house will be built.

The New York Terminal Co., New York, recently organized under Delaware laws, Henry J. Hemmens, 64 Wall Street, representative, has tendered a proposition to the Board of City Commissioners, Bayonne, N. J., for the construction of an industrial and marine terminal on local waterfront property, extending from the plant of the Amer-

ican Radiator Co., Forty-ninth Street, to that of the Standard Oil Co., about one mile. The application states the ultimate cost as \$150,000,000, including industrial buildings and warehouses, power plant, docks, loading machinery, traveling cranes and other mechanical equipment. It is purposed to complete the project in five years. A special meeting of the commissioners will be held on Sept. 11 to consider the proposal.

The Associated Utilities Co., care of William Braun & Co., 30 Church Street, New York, engineers, will take bids for the erection of its proposed new ice manufacturing and cold storage plant at Newark, comprising an eight-story structure, 105 x 165 ft., to cost \$1,000,000, with machinery. John Decker, 19 Ridgewood Avenue, West Orange, N. J., is architect.

The Vreeland Motor Co., Inc., Chestnut Street, Hillside, Newark, manufacturer of motor trucks and buses, is arranging an expansion program for extensive increased production. E. E. Vreeland is president.

The Herdman Motor Co., 313 Central Avenue, Newark, will install a machine repair and service works on the second floor of the two-story building at Central Avenue and Hudson Street, recently leased for expansion.

The New York Edison Co., Irving Place and Fifteenth Street, New York, has plans for a three-story power house, 41 x 200 ft., at 27 West Forty-seventh Street, estimated to cost \$190,000. William Whitehill, 709 Sixth Avenue, is architect.

New England

BOSTON, Aug. 21.

THE improvement in machine tool sales in this territory, noted last week, proved to be a flash in the pan, the market having settled back into an inactive condition. Most machine tool dealers look for no notable improvement this month, but do anticipate increased business in September. This belief is based on intimations made by prospects that business under negotiation may be closed next month. Of the business put through last week, the purchase of a 36-in. Gray planer and a 400-ton Ryerson wheel press by the Central Vermont Railroad is the most important. The Rutland Railroad in all probability will purchase some shop equipment next month, but its appropriation, it is understood, has been somewhat reduced. Other New

England railroad prospects have become inactive. A 14-in. vertical surface grinder to a Massachusetts maker of textile machinery, a small punch and shear to a steel mill, a high speed upright drill to a South Boston concern, a used No. 2 power press and a used Milwaukee milling machine to a Reading, Mass., shop are illustrative of the minor importance of current business. Gray & Davis, Inc., Cambridge, Mass., automobile accessories, is about to close on three or four milling machines, and is negotiating on lathe equipment. The small tool business holds up remarkably well.

The J. N. Lapointe Co., New London, Conn., broaching machines and broaches, is operating overtime, including Sundays, and several other New England machine tool builders have sufficient business on their books to keep plants operating at capacity for several weeks. New business, however, is light.

The Underwood Machinery Co., 110 Mt. Vernon Street, Boston, has been awarded contract for a coal handling system to be erected by the Boston Elevated Railway at Everett, Mass.

No date has been set for bids to close on a proposed one-story, 52 x 100-ft. manufacturing plant and warehouse to be erected by the Acme Mfg. Co., South Main Street, Bangor, Me., pipe clamps, etc.

Battery, operating and machine rooms constitute the four-story, 57 x 64-ft. addition to sub-station No. 12, Chatham Street, Boston, being erected for the Edison Electric Illuminating Co., 39 Boylston Street, Boston.

The City of Boston has under consideration two plans for enlarging the Mechanic Arts High School, Belvidere Street. One plan involves taking occupied land by eminent domain and the other building on Dalton Street vacant land. In either case various workshops will be provided and additional metal working equipment will be needed. The purchase of the latter will not be made for several months.

The State of Connecticut will shortly start the erection of a two-story, 50 x 90-ft. manufacturing plant at the Connecticut State Prison, Wethersfield, which will contain a machine shop.

The Thin Sheet Metals Co., Railroad Hill Street, Waterbury, Conn., has awarded to Tracy Brothers' Co., that city, a contract for the erection of a 25 x 62-ft. mill addition.

The Supply Officer, United States Navy, Newport, R. I., will take bids at once for one electric hardening furnace, ordnance requisition 9-1924.

Contract has been let by the French Worsted Co., Woonsocket, R. I., to O. D. Purington & Co., Providence, R. I., for the erection of a new two-story machine shop at its mill, to be equipped for textile machinery repairs and parts manufacture. Walter F. Fontaine, Woonsocket, is architect.

The Connecticut Foundry Co., Rocky Hill, Conn., has awarded a contract to Charles P. Waterman, Inc., for the erection of a new addition, 20 x 30 ft., to be equipped for cupola service.

The New England Power Co., 50 Congress Street, Boston, is arranging an appropriation of about \$10,000,000 for extensions and improvements, to include the construction of a large electric generating plant at Davis Bridge, near Whitingham, Vt.

Manual training equipment will be installed in the new three-story high school addition to be erected at Lewiston, Me., estimated to cost \$100,000, for which bids have been called on a general contract. H. S. Coombs, 11 Lisbon Street, is architect.

The State Prison Department, Hartford, Conn., has plans in preparation for the construction of a two-story building, 50 x 90 ft., at the state prison, Wethersfield. It will be equipped as a machine shop and for other mechanical service. Buck & Sheldon, Inc., 60 Prospect Street, Hartford, is architect and engineer.

The Danbury & Bethel Gas & Electric Light Co., Danbury, Conn., will issue bonds for \$600,000, a portion of the proceeds to be used for extensions in electric generating plants and system. The property is operated by Henry L. Doherty & Co., 60 Wall Street, New York, Henry L. Doherty, president.

The Magee Furnace Co., Taunton, Mass., manufacturer of furnaces and stoves, plans for the installation of a press for sheet metal work, about one-ton capacity.

The Shawmut Engineering Co., 24 Milk Street, Boston, will commence the erection of a new one-story mechanical shop at the rear of 185 Freeport Street, estimated to cost \$22,000.

A one-story power house will be erected by the board of directors, Woonsocket Hospital, E. Harris Rathbun, president, 115 Cass Avenue, Woonsocket, R. I., in connection with a new three-story and basement hospital addition. K. Taylor & Co., 142 Berkeley Street, Boston, are architects.

The F. W. Mann Co., Inc., Milford, Mass., manufacturer of automobile jacks, etc., recently acquired by new interests, has been reorganized, and has plans under consideration for expansion. James R. Kimball has been elected president; L. M. Vesey, vice-president; Philip S. Kimball, treasurer, and Walter B. McFarland, secretary.

The Bridgeport Hardware Mfg. Corporation, Iranistan Avenue, Bridgeport, Conn., has filed plans for the erection of a one-story addition.

G. N. Lawson, 242 Freeport Street, Dorchester, Mass., operating a boat-building plant, is planning for the installation of a surface planer, 18 or 20 in.

Manual training equipment will be installed in the new two-story East Side high school to be erected at Boston and Central Avenues, Bridgeport, Conn., estimated to cost \$900,000, for which bids will be asked on a general contract early in September. E. B. Caldwell, Jr., 886 Main Street, is architect.

The Parker Wire Goods Co., Washington and Lamartine Streets, Worcester, Mass., purposes to develop a metal-stamping business, in connection with its regular standard and special wire goods production, and has enlarged the stamping department for immediate requirements. The new plant, recently completed, is now in operation and will be advanced to maximum output.

The Moore Drop Forging Co., Fisk Avenue, Springfield, Mass., has awarded a contract to the Adams & Ruxton Construction Co., Springfield, for extensions and improvements in its local plant.

Philadelphia

PHILADELPHIA, Aug. 21.

CONTRACT has been let by the Parsons Specialty & Machine Works, Hancock Street, Philadelphia, to the George Kessler Contracting Co., 1733 North Marvine Street, for the erection of a new one-story plant on Courtland Street, near Fifth Street, estimated to cost \$23,000.

C. M. Roswell, 1162 Marlin Road, Philadelphia, machinery dealer, has inquiries out for one steam turbine-generator, 300 to 500 kw., 150 to 175 lb. steam pressure, with condenser and accessories; also for two or three transformers, 25,000-volt high to 380-volt low tension, to operate 500 kw. rotary converter.

A one-story power house will be constructed at the new plant of the Colonial Knitting Mills, Inc., Clearfield and B Streets, Philadelphia, to cost about \$200,000, for which a general contract has been let to the Austin Co., Jefferson Building.

The Adams & Westlake Co., Philadelphia, manufacturer of hardware products, has taken title to the four-story factory property at 2214-26 West Ontario Street, heretofore held by the Adlake Co., for a consideration of \$154,500.

The Steel Heddle Mfg. Co., Twenty-first Street and Allegheny Avenue, Philadelphia, manufacturer of steel heddles for textile looms, etc., has tentative plans for enlargements at its local plant, to include the installation of additional equipment. Work will commence on the proposed new branch plant at Greenville, S. C., for which plans recently were drawn, estimated to cost \$100,000 with machinery.

John M. Greene, Drexel Building, Philadelphia, has inquiries out for one 48 in. x 14 ft. horizontal return tubular boiler, with auxiliary equipment, to operate at 80 lb. pressure.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until Sept. 4 for 2000 high compression pistons and miscellaneous spare parts for Liberty engines, for use at the naval aircraft plant, Philadelphia, schedule 1224.

The Budd Mfg. Co., Twenty-eighth Street and Hunting Park Avenue, Philadelphia, manufacturer of steel automobile bodies, is said to be planning for the installation of a number of traveling cranes in its new six-story addition, 100 x 325 ft., for which bids on a general contract have been asked. The Ballinger Co., Twelfth and Chestnut Streets, is architect.

The Public Ledger Co., Independence Square, Philadelphia, has awarded a contract to Doyle & Co., 1519 Sansom Street, for the erection of a one-story service and machine repair building for company motor trucks and cars at 1214-16 North Twenty-sixth Street, to cost about \$23,000.

Elevating and conveying machinery, power equipment and other mechanical equipment will be installed in the eight-story warehouse and distributing plant to be erected by the Terminal Warehouse & Transfer Co., Green Street and Delaware Avenue, Philadelphia, at Front and Brown Streets, to cost \$300,000, for which a general contract has been let to the Turner Construction Co., 1713 Sansom Street.

The Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Monterey, Mexico, for American machinery for the manufacture of

door butts, door bolts, etc.; also, from a concern at Bucharest, Rumania, for caterpillar road tractors or other models of tractors for heavy transportation on poor roads; from a company at Diember, Dutch East Indies, for American brass cloth; and from a company at San Juan, Porto Rico, which desires to get in touch with American manufacturers of tungsten filament lamps.

The Cattle Brothers Corporation, 2115 Vine Street, Philadelphia, manufacturer of galvanized metal products and operating a general galvanizing works, has acquired the one-story factory at 1712-26 North Ninth Street, for a consideration of \$31,500, for a new plant.

Manual training equipment will be installed in the new three-story junior high school to be erected at Twelfth Street and Pennsylvania Avenue, North Wildwood, N. J., estimated to cost \$130,000, for which bids will soon be called on revised plans. H. Rex Stackhouse, 1120 Locust Street, Philadelphia, is architect.

The York Gas Co., York, Pa., will install additional machinery at its plant to increase the capacity from 2,300,000 to 5,300,000 cu. ft. per 24 hr.

The Glen Alden Coal Co., Jefferson Avenue and Mulberry Street, Scranton, Pa., has plans for the erection of a one-story hoisting plant, 54 x 97 ft., estimated to cost \$60,000 with machinery. W. W. Ingils is president.

The Davis-Murray Motor Co., 1921 Union Avenue, Altoona, Pa., is planning for the erection of a one-story service and repair building, 25 x 100 ft., in connection with new local headquarters, estimated to cost \$100,000. J. R. Davis is president.

Fire, Aug. 10, destroyed a portion of the plant of the Pittston Stove Works, William Street, Pittston, Pa., with loss estimated at \$30,000. It is planned to rebuild.

Officials of the Bethlehem Fabricators, Inc., manufacturer of structural steel shapes, and the Pharo Mfg. Co., manufacturer of mechanical specialties, both of Bethlehem, Pa., have organized the Pharo Governor Co., with capital of \$30,000, to establish and operate a local plant for the manufacture of governors for internal combustion engines, automotive equipment and metal goods. Officers of the new company will include Richard Chapman, G. C. Pharo and R. P. Hellstrom.

The Board of Education, New Albany, Pa., is having plans drawn for the erection of a two-story and basement vocational school, 80 x 100 ft., estimated to cost \$50,000. H. C. Childs, 404 Lincoln Street, Sayre, Pa., is architect.

The Hamburg Plow Works, Hamburg, Pa., manufacturers of plows and other agricultural implements, have purchased property adjoining their plant for enlargements.

J. M. Frable, Palmerton, Pa., has plans for the construction of a large planing mill on Franklin Avenue. A list of machinery to be installed, including motor-driven tools, will be arranged at an early date.

A machine shop will be installed in the one-story automobile service building, 50 x 125 ft., to be erected by the H. Noel Co., Minersville, Pa., for which plans are being drawn by G. C. Freeman, Sixth and Court Streets, Reading, Pa., architect.

The Sullivan & Relly Coal Co., Wilkes-Barre, Pa., has plans for the construction of a new coal breaker, to cost in excess of \$55,000, including machinery.

The Metropolitan Edison Co., Reading, Pa., has arranged for an increase in stock from 90,000 to 300,000 shares, a portion of the proceeds to be used for extensions and improvements, including the construction of an electric generating plant in the vicinity of Middletown, Pa., and transmission system.

The Sherman Lumber Co., Rock Glen, Pa., has acquired a large tract of timber land in the Beaver Valley section, near Rock Glen, and plans for the erection of a saw mill, power house and other mechanical buildings.

P. B. Sawyer and C. M. Walter, Allentown, Pa., represented by Thomas J. Perkins, Allentown, are organizing three new electric power companies under the names of the Loyalsock, Greenwood and Armstrong Power & Light companies, to install and operate plants and systems in portions of Loyalsock, Greenwood and Armstrong Townships, Lycoming and Columbia Counties.

Donnelly & Co., Philadelphia, has been obliged to obtain new quarters owing to the construction of the Delaware River bridge and are moving from 531-35 North Fourth Street to 478 York Avenue. Extensive improvements are being planned on the purchased site, which extends from York Avenue to Fifth Street. Several buildings will be razed to make room for a new warehouse. Bids for construction will be advertised within a month. Donnelly & Co. handle blacksmiths' supplies, heavy hardware, metal lath, builders' supplies and coal and mine equipment.

The Grantville Electric Co., Grantville, Pa., recently or-

ganized, is arranging for the installation of a plant and system for light and power service in East Hanover Township. H. C. Stambaugh and S. S. Seyfert head the company.

Baltimore

BALTIMORE, Aug. 20.

THE United Railways & Electric Co., Continental Building, Baltimore, will erect four automatic substations for the operation of its car system. The cost will be about \$750,000.

D. C. Elphinstone, 408 Continental Building, Baltimore, has inquiries out for two 18-ton, 36-in. gage and two 30 to 50-ton standard gage saddletank locomotives.

Architects have been selected for nine school projects in Baltimore, most of which will include vocational training departments. The selection of architects was made by a joint committee representing the Architectural Commission, Public Improvement Commission and Board of School Commissioners and approved by the Architectural Commission.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until Sept. 4, for one motor-driven power brake for use at the Norfolk, Va., navy yard, schedule 1225; also, until Sept. 11, for steel balls and bearings, schedule 1228; and until Sept. 11 for miscellaneous pumping machinery and spare parts for the Boston navy yard, schedule 1233.

A machine shop will be installed in the new service building to be erected by the Etheredge Motor Co., 219 West Fourth Street, Charlotte, N. C., estimated to cost \$100,000 with equipment. Lockwood, Greene & Co., Piedmont Building, are architects and engineers.

John J. Hanson, superintendent of Lamps and Lighting, City Hall, Baltimore, will take bids until Aug. 29 for a quantity of plain iron lamp posts for gas-lighting service, as per specifications on file.

The Eastern Sewer Pipe & Brick Co., Hagerstown, Md., recently formed with a capital of \$350,000, has acquired property on the Opequon River for the erection of a new plant to cost approximately \$150,000 with machinery. A power house and machine shop will be built.

The City Council, Hagerstown, Md., has arranged a series of hearings with the Public Service Commission to perfect plans for a bond issue of \$300,000, for the construction of a municipal electric power plant.

The Quartermaster, United States Marine Corps, Washington, D. C., will take bids until Aug. 27 for electrical equipment, including 26,000 dry batteries, flashlights, etc., schedule 89.

The Tiger Tire & Rubber Corporation, 749 Equitable Building, Baltimore, has been organized with a capital of \$1,000,000 as a subsidiary of the Tiger Tire Co., a Canadian concern. Property has been acquired at Havre de Grace, Md., for the erection of a new plant with initial capacity of 300 tires per day, estimated to cost \$150,000 with machinery. A power house will be constructed. Horace H. Hastings and Edward Fetter, both officials of the Canadian company, head the new organization.

The Southern Supply Co., Calvert & Saratoga Streets, Baltimore, manufacturer and dealer in pipe, plumbing equipment, etc., has awarded a contract to the Consolidated Engineering Co., Calvert Building, for the erection of a four-story and basement addition to its works, 78 x 100 ft., at 315-19 North Calvert Street.

The Board of Works, Baltimore, has concluded arrangements with the Crook Shipbuilding Co. for the purchase of its local plant for a consideration of \$440,000, and will utilize the property in connection with harbor development and improvements.

The Stanley Coal Co., Hutton, near Oakland, Md., has plans under way for the installation of electric power and mechanical equipment on a local tract of 800 acres of coal lands, recently acquired, to include elevating, conveying and other machinery.

The Carter's Production Works, Inc., 210 South Front Street, Wilmington, N. C., machine equipment, has inquiries out for machinery for a new sawmill with initial capacity of 15,000 ft. per day. A power house is planned in connection with the plant. O. Carter is general manager.

The Northern Electric Co., Elkton, Md., will make extensions and improvements in the plant and system of the Gilpin Falls Electric Co., recently acquired, including the installation of additional equipment and transmission lines.

A machine shop will be installed in the new automobile service building, 60 x 150 ft., to be erected at Greenville, S. C., on East Washington Street, leased by W. M. Thompson, automobile dealer. It will cost about \$90,000. The general contract has been let to the Potter-Shackleford Construction Co., Greenville.

The Board of Commissioners, Maryland Penitentiary, Forest and Eager Streets, Baltimore, is having plans drawn for the erection of a new one-story foundry at the institution, to cost in excess of \$50,000 with equipment. Colonel C. B. Sweezy is in charge.

The Georgia Railway & Power Co., Atlanta, Ga., will commence the construction of a new power house at Summerville, Ga., for service at Summerville, Berryton and vicinity, to cost about \$95,000.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., is perfecting plans for the development of its plant for the manufacture of locomotives and parts, in connection with a present locomotive repair department, now in operation. Expansion will also be arranged in the line of manufacture of steel automobile wheels, water turbines, etc., utilizing buildings heretofore devoted to shipbuilding work. The foundry at the yard is being developed for commercial casting production, including steel, brass, bronze and malleable iron products; the steel forging department will likewise be expanded for commercial production.

J. W. Morgan, Riverton, Va., has inquiries out for electrically-operated pumping machinery for installation in a local plant.

The Board of City Commissioners, Raleigh, N. C., has rejected bids recently received for pumping machinery, tanks and other equipment for the municipal waterworks, and will call for new bids on revised specifications at an early date. W. C. Olsen, Kinston, N. C., is engineer.

Manual training equipment will be installed in the new high school for boys to be erected at Macon, Ga., estimated to cost \$100,000. The Board of Education is in charge.

The Cascade Mills, Inc., 306 North Main Street, Lexington, N. C., is planning for the construction of a new power plant in connection with extensions and improvements in its textile mill at Mooresville, N. C. The plant will have an initial capacity of 750 hp. Lockwood, Greene & Co., Charlotte, N. C., are architects and engineers.

The Common Council, Graham, Va., has tentative plans for the installation of electrically-operated pumping machinery in connection with proposed extensions to the municipal water system.

C. H. Ferrelle, P. O. Box 838, Savannah, Ga., is planning for the purchase of machinery for stamping out designs in sheet metal and tin, for installation in a local plant to be devoted to the production of stamped metal specialties.

Manual training equipment will be installed in the new high school to be erected at Valdosta, Ga., estimated to cost \$150,000, for which bonds will be voted on Sept. 20. The Board of Education is in charge.

A boys' industrial and mechanical building and cold storage plant will be constructed at the Caswell Training School, Kinston, N. C., in connection with a number of other structures, for which bids are now being taken on a general contract, estimated to cost \$200,000. H. A. Underwood, 916 Commercial Bank Building, Raleigh, N. C., is engineer.

A machine shop will be installed in the new one-story service building to be erected by the Radford Motor Co., Radford, Va., 50 x 150 ft., estimated to cost \$55,000, for which bids will be called at once on a general contract.

Manual training equipment will be installed in the new high school to be erected at Hickory, N. C., for which bonds for \$250,000 have been voted. Plans will be prepared at an early date. The Board of Education is in charge.

Pittsburgh

PITTSBURGH, Aug. 20.

SALES of individual machine tools have shown some increase in the past week, but the market has not emerged from the dullness of the past two months. New projects involving the installation of several tools are not numerous, and those pending are not moving toward the closing stage with much speed. So widespread was the recent tool inquiry of the Pennsylvania Railroad, Central Region, circulated that the purchasing department had a real job in tabulating the bids, and while some expect awards to be made of some of the tools this week, the more common belief is that purchases are still a few weeks off. Purchases of the tools for the new plant of the Standard Sanitary Mfg. Co., at Baltimore, also are some distance off, since the plans are yet to be approved and the appropriation granted.

In heavy equipment the most interesting project now up is a new bar mill for the Jones & Laughlin Steel Corporation; prices for estimating purposes have been asked for. It will be a 9-stand mill, to be equipped with synchronous motors.

Barton R. Shover, Oliver Building, Pittsburgh, is consult-

ing engineer for C. D. Thomas and others, who are projecting a company to manufacture cold-drawn steel in Warren, Ohio.

Cranes sales in the week have been few, but there has been fair inquiry. The Pittsburgh Plate Glass Co. wants a 6-ton crane for its new Creighton, Pa., works and the Carnegie Steel Co. has put out an inquiry for 14 open-hearth jib cranes of about 3 tons capacity for its Edgar Thomson works. The Pittsburgh & Lake Erie Railroad is in the market for a 30-ton locomotive crane, which can be equipped with a magnet.

The Fort Pitt Bedding Co., Pittsburgh, Pa., is in the market for an automatic riveting machine.

Plans have been authorized by the Board of Commissioners, Allegheny County Court House, Pittsburgh, for the erection of a three-story and basement addition, 70 x 325 ft., to the county mechanical shops and work shops at Blawnox, formerly Hoboken, Pa., estimated to cost \$200,000, with equipment. S. F. Heckert, Bessemer Building, is architect.

The Oakland Motor Car Co., 4601 Baum Boulevard, Pittsburgh, with headquarters at Detroit, will make extensions and improvements in its local service and repair building, Baum Boulevard and Craig Street, to cost about \$25,000.

The Guyan Machine Shops, Logan, W. Va., machinery dealers, have inquiries out for one engine lathe, 18 to 20 in. by 10 ft.; also for a slitting punch and shear to handle ½-in. plate stock; hydraulic wheel press, about 250 tons capacity, and hydraulic press for truck tires, similar capacity; one coil winding machine; a number of transformers, 1 to 20-kw. capacity; one cylinder grinder for automotive service, and a quantity of natural gas burners for hot-water furnace service.

The Borough Council, Smethport, Pa., is considering the installation of electrically operated pumping machinery in connection with the proposed acquisition of the local waterworks and extensions and betterments.

Manual training equipment will be installed in the two-story high school to be erected at Avalon, Pa., estimated to cost \$180,000, for which bids will be asked on a general contract at an early date. The M. C. Kressley Co., 13 Fourth Street, Harrisburg, Pa., is architect.

A machine shop will be installed in the new two-story automobile service building, 50 x 70 ft., to be constructed by Bartey Brothers, West Liberty Avenue, Dormont, Pittsburgh, on McFarlane Road, to cost about \$50,000.

The City Council, Charleston, W. Va., is planning for the installation of electrically operated pumping machinery in connection with extensions and improvements in the South Hill municipal water system.

The Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, will build a new pumping plant at its works at Creighton, Pa.

Manual training equipment will be installed in the new two-story high school to be erected at Ridgway, Pa., estimated to cost \$125,000, for which bids are being received on a general contract. The M. C. Kressley Co., 13 Fourth Street, Harrisburg, Pa., is architect.

The Westover Borough Clearfield Public Service Co., Clearfield, Pa., recently organized, has tentative plans for the installation of an electric power plant and system for service in Westover Borough. C. C. Saverling, Johnstown, Pa., is treasurer.

A one-story pumping plant will be erected by the Equitable Gas Co., 435 Sixth Avenue, Pittsburgh, a subsidiary of the Philadelphia Co., at its works at Elrama, Pa.

Manual training equipment will be installed in the new three-story high school to be erected at Logan, W. Va., estimated to cost \$150,000.

A lathe, drill press and other tools and equipment will be installed in the machine department in the new two-story and basement automobile service building, 40 x 70 ft., to be erected by the W. H. Frest Co., Warren, Pa., on Liberty Avenue, estimated to cost \$45,000.

C. R. Geisler, Ferguson Building, Pittsburgh, architect, has plans in preparation for the erection of a one-story radiator repair and mechanical works on Craig Street, to cost about \$16,000, for which the owner's name will be announced at an early date.

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, N. Y., has closed its locomotive shops at Du Bois, Pa., temporarily, for the purpose of making improvements and repairs in cranes and other machinery, including the installation of other equipment.

The Deep Run Coal Co., Cumberland, Md., will install mechanical and electric power equipment at properties in the Elk Garden district, near Elkins, W. Va. About \$300,000 will be expended in opening up new properties and installing machinery. Benjamin Robinson, Sr., Frostburg, Md., is consulting engineer.

Manual training equipment will be installed in the new high school at Fayetteville, W. Va., for which ground has been broken, estimated to cost \$100,000. The Board of Education, C. C. Janutolo, architect, is in charge.

A machine shop will be installed in the one-story and basement automobile service building, 60 x 190 ft., to be erected on Penn Avenue, Pittsburgh, by W. W. Martin, 5847 Center Avenue, for which a general contract has been let to J. G. McLean, 4910 Baum Boulevard, estimated to cost \$45,000.

Buffalo

BUFFALO, N. Y., Aug. 21.

CONTRACT has been awarded by the Harrison Radiator Corporation, Lockport, N. Y., manufacturer of automobile radiators, to the Charles R. Hedden Co., Inc., 342 Madison Avenue, New York, for the erection of a one-story addition on South Street, 155 x 396 ft., estimated to cost \$500,000, with equipment. It will be used largely for the production of radiators for the General Motors Corporation. H. B. Harrison is president.

The controlling interest of John N. Willys, president of the Willys-Overland Co., Toledo, Ohio, and associates, in the United States Light & Heat Corporation, Highland Avenue, Niagara Falls, N. Y., manufacturer of industrial lighting equipment, storage batteries, etc., has been acquired by C. O. Mininger and C. H. Kelly, Toledo. Plans are being considered for expansion.

The Roulette Glass Co., Corning, N. Y., G. S. Goff, president, recently organized, is perfecting plans for the construction of its proposed initial plant at Roulette, Pa., to cost about \$300,000, including machinery. A power house is planned.

The Houde Engineering Corporation, Buffalo, has acquired a tract of three acres of land on Northland Avenue, near Fillmore Avenue, as a site for the erection of a new plant, to cover practically the entire area. It will cost more than \$75,000, with machinery.

A machine repair and service department will be installed in the new automobile and warehouse building to be erected by the Rhodes Brothers Trucking Co., 409 Baldwin Street, Elmira, N. Y., estimated to cost \$100,000. F. Rhodes heads the company. H. Tiffany, Phelps Building, Binghamton, N. Y., is architect.

The Eastman Kodak Co., Kodak Park, Rochester, N. Y., is perfecting plans for the erection of a five-story and basement addition at State and Brown Streets, 87 x 197 ft., with wing extension, 22 x 88 ft., to cost more than \$85,000.

Fire, Aug. 14, destroyed the machine shop and automobile service works of Henry Austin, South Main Street, Avoca, N. Y., with loss estimated at \$13,000. It is planned to rebuild and install new machine tools and other equipment.

An appropriation of \$1,000,000 has been arranged by the American Lithographic Co., 111 Swan Street, Buffalo, for the erection of a new plant on Amherst Street, to include electric power machinery, conveying equipment and other mechanical equipment, for which a list will soon be available.

Detroit

DETROIT, Aug. 21.

WORK will commence soon on a one-story addition to the plant of the Federal Screw Co., 3400 Martin Street, Detroit, estimated to cost \$20,000.

Plans are being considered by the Great Western Smelting & Refining Co., 5205 Lorain Avenue, Detroit, for the erection of a one-story addition to its foundry on Russell Street.

Manual training equipment will be installed in the new three-story high school addition to be erected at Alpena, Mich., estimated to cost \$100,000. The Warren-Holmes-Powers Co., Tussing Building, Lansing, Mich., is architect.

The McLean Motor Car Co., Port Huron, Mich., has concluded negotiations with the local Chamber of Commerce for a tract of property in the South Park section for the construction of a plant for the manufacture of a popular-priced automobile. The temporary address of the company is care of the secretary of the Chamber of Commerce.

The Castle Mining Co., Ramsay, Mich., is planning for the installation of a lathe, drill press and other equipment, including hoisting machinery and elevating equipment. E. W. Hopkins is in charge.

The Stearns Motor Car Co., North Gaylord and Filer Streets, Ludington, Mich., manufacturer of automobiles, has tentative plans for the construction of a two-story addition, 50 x 150 ft. J. S. Stearns is head.

The Motor Wheel Corporation, Lansing, Mich., has taken

over the manufacture of steel automobile wheels at its plant, heretofore produced at the works of the Midland Steel Co., formerly the Detroit Pressed Steel Co. The company acquired the patents of the Distel wheel a number of months ago, and in connection with the transferring of operations, is considering plans for plant expansion.

The Olds Motor Works, Lansing, Mich., manufacturer of automobiles, has preliminary plans for plant expansion for the manufacture of four and eight-cylinder cars. It is purposed to arrange an appropriation of not less than \$1,500,000 for additional buildings and machinery.

Manual training equipment will be installed in the proposed addition to be erected at the high school, Ludington, Mich., to cost about \$75,000, for which an architect will be selected to prepare plans at an early date. The Board of Education is in charge.

Dodge Brothers, Inc., Detroit, will build a power plant at its automobile manufacturing plant, in connection with an expansion program inaugurated a number of months ago involving \$5,000,000 for new buildings and equipment. A cyanide building will also be constructed. A six-story assembling plant, 75 x 1000 ft., has been completed and will soon be placed in service.

The Michigan Seating Co., Jackson, Mich., manufacturer of car seats, etc., has plans in progress for the erection of a five-story addition, 75 x 133 ft., to cost in excess of \$75,000, with equipment. H. L. Mead, Grand Rapids, Mich., is architect.

Manual training equipment will be installed in the proposed high school to be erected by the Board of Education, Ironwood School District, Ironwood, Mich., estimated to cost \$925,000.

Chicago

CHICAGO, Aug. 20.

IN an exceedingly quiet market railroad buying is the chief feature of interest. The Elgin, Joliet & Eastern has completed purchases of machine tools amounting to \$100,000. The Pere Marquette, through its purchasing office at Detroit, has bought all of the machine tools included on its list for the Grand Rapids shops, but no word has been received here as to the size of the purchase in the aggregate. The Santa Fe has placed orders for two hydraulic wheel presses, and the Burlington has bought a few minor items left over from its Denver, Colo., list. Buying by industrial companies remains exceedingly light, but there are signs of renewed interest in the market on the part of automobile manufacturers. While none of the automotive plants in the territory adjacent to Chicago is now active in the market, word comes from Detroit that the Hudson Motor Car Co. has bought seven standard turret lathes and that the Ford Motor Co. has authorized a large expenditure for additional manufacturing equipment.

The Brunswick-Kroesshell Co., manufacturer of ice machines, Chicago, which is erecting a new plant, has placed an order for a 5-ft. radial drill. The Rock Island Lines are inquiring for a 6-ft. radial drill. The Biddle Purchasing Co., Chicago, is in the market for a 48 x 48-in. x 12-ft. planer. Unless the market takes a quick turn for the better, it is probable that August will be the leanest month of the year for local dealers. Here and there a manufacturer of a certain line of tools is finding business slightly improved. A maker of hand screw machines and turret lathes has booked considerably more orders thus far this month than during the same period in July.

Ground has been broken at Grand Rapids, Mich., for a plant to cost \$250,000 for the Certaineed Products Corporation, formerly the Acme Cement Plaster Co.

The Columbus Machine Works, Columbus, Ind., plans to move its plant to Crothersville, Ind.

The Wayne Tank & Pump Co., Fort Wayne, Ind., will erect a one-story plant addition, 60 x 110 ft., to house stores, engineering, laboratory and production departments. A second building which will be constructed is an addition to the factory, 40 x 315 ft., which will be devoted entirely to the assembly and testing of pumps. The cost of improvements is placed at \$80,000.

The Coons Mfg. Co., recently incorporated with \$100,000 capital stock, will erect a plant at Abingdon, Ill., for the manufacture of silos and other wooden products.

The American Brake Shoe & Foundry Co., Chicago, has purchased a 4½-acre site in North Kansas City, Mo., for the erection of a plant.

The Wolff Mfg. Co., manufacturer of plumbing supplies, Chicago, has purchased the foundry of the Brady Foundry Co., Chicago, a plant containing 100,000 ft. of floor space at

the northeast corner of Western Avenue and Forty-fifth Street. With additions and alterations now being planned the Wolff Mfg. Co. will convert this plant into one of the largest bath tub foundries in the country. The initial capacity contemplated is 900 bath tubs a day.

The Chicago Window & Door Screen Co., 5118 South State Street, Chicago, will take bids for the erection of a new two-story addition, 58 x 112 ft., estimated to cost \$50,000. Milton Eichberg, 64 West Randolph Street, is architect.

The Domestic and Foreign Commerce Department, Chicago Association of Commerce, 10 South La Salle Street, has received an inquiry from a company at Guadalajara, Jalisco, Mexico (No. 2317), desirous to get in touch with American manufacturers of aluminum containers, and now in the market for 5000 such containers as per specifications on file. The company, it is stated, uses 100,000 aluminum containers annually.

Manual training equipment will be installed in the new high school to be erected at Orange City, Iowa, estimated to cost \$80,000, for which ground will be broken at an early date. Beuttler & Arnold, Grain Exchange Building, Sioux City, Iowa, are architects.

The Wayfinder Mfg. Co., 1111 Fifteenth Street, Denver, Colo., is in the market for a quantity of malleable iron castings; also for 1-in. stamped or cast grooved pulleys.

J. J. Benas, 144 West Kinzie Street, Chicago, operating a machine shop, is planning for the installation of a punch press.

The W. T. Rawleigh Co., 101 South Liberty Avenue, Freeport, Ill., has plans in preparation for the erection of a one-story power plant, 100 x 110 ft., estimated to cost \$180,000, with machinery. J. R. & E. J. Low, First National Bank Building, Madison, Wis., are engineers.

The State Board of Control, Des Moines, Iowa, is having plans prepared for the construction of a four-story and basement addition to the state-owned chair manufacturing plant at Fort Madison, estimated to cost \$75,000, with machinery. H. F. Liebbe, State Capitol Building, Des Moines, is state architect.

The Public Service Co. of Northern Illinois, Chicago, is arranging for a stock issue to total \$498,000, the majority of the proceeds to be used for extensions and improvements in generating plants and system.

Manual training equipment will be installed in the new two-story and basement high school to be erected at Proctor, Minn., estimated to cost \$85,000, for which bids will be called on a general contract in September. E. F. Bromhall, Alworth Building, Duluth, Minn., is architect.

The State Board of Administration, Bismarck, N. D., will take bids for the construction of a one-story and basement power house at its buildings at Dunseith, N. D., estimated to cost \$40,000. Keith & Burke, Equity Building, Fargo, N. D., are architects.

The Reynolds Electric Co., 2650 West Congress Street, Chicago, manufacturer of electrical equipment, will build a one-story addition, 50 x 75 ft.

Cincinnati

CINCINNATI, Aug. 20.

ORDERS for machine tools continue fair, and some manufacturers report that the month of August will be better than July if present rate of bookings is maintained. While no large purchases were made, there was some railroad buying and the automotive industry also took a number of tools, the General Motors Corporation in particular being a good buyer of drilling machines. Orders continue to be for one and two machines and new inquiries generally run to the same number. No action has yet been taken on the list recently issued by the Big Four Railroad, but it is expected that something definite will develop within the next two weeks. The Pennsylvania and Baltimore & Ohio lists have not been bought, but it is expected that orders will be placed against the latter this week. While some shops have slightly reduced their operations, generally speaking there has been little change. Most of the manufacturers are booked up till the middle of September, and on some machines it is not possible to get delivery promises better than late October. Manufacturers of automatic screw machines are reported to have enough orders on books to keep them operating at present schedules until December.

The Middletown Machine Co., Middletown, Ohio, has been incorporated with capitalization of \$150,000 by C. W. Shartle and H. D. Martindale. They recently purchased the plant of the Willard-Middletown Machine Co., which, it is understood, will be operated as an adjunct of the Shartle Bros.

Machine Co. The Weber Tool & Die Co. has leased part of the plant.

The Linde Air Products Co., Columbus, Ohio, has awarded contract for the erection of a factory building, 106 x 141 ft., on Marion Road.

The Corelock Tube & Rubber Co., Washington Courthouse, Ohio, has been incorporated with a capitalization of \$50,000 to manufacture a puncture-proof inner tube for automobiles. J. E. Stewart is one of the incorporators.

Gohmann Bros. & Kahler, New Albany, Ind., have just completed the erection of an addition to their foundry building, doubling its capacity for production of gray iron and brass castings.

The Louisville Gas & Electric Co., Louisville, Ky., is planning extensive improvements to its Riverside power plant, involving the expenditure of approximately \$500,000. Work will be started in the fall and completed next spring.

The River-Rail Transfer Co., Cincinnati, has been incorporated with a capitalization of \$150,000, and will erect an unloading plant on the Ohio River to facilitate the shipment and receipt of heavy freight from barges. Julian A. Pollak of the Pollak Steel Co. is president.

The General Electric Co. is reported to have purchased the plant of the Circleville Strawboard Co., Circleville, Ohio, which manufactures fiber containers for shipping purposes. It will be placed in operation in about 30 days.

The City of Newport, Ky., is contemplating the expenditure of \$500,000 for improvements to its waterworks system. Included in the expenditure will be considerable for pumping equipment.

Milwaukee

MILWAUKEE, Aug. 20.

THE aspect of business in machine tools and general foundry and machine shop equipment has improved perceptibly during the past week. Inquiry for tools has shown an upward trend from the low point reached during the first week in August, and while buying has continued of a scattering nature, the aggregate of sales was slightly higher, with prospects of further gains. The local trade feels that the demand has passed the off-peak period and is due for a steady incline. Inquiry emanated mainly from railroad and automotive sources and covered miscellaneous requirements, no sizable lots being embraced in requests for quotations or delivery dates.

The Allis-Chalmers Mfg. Co., Milwaukee, has taken a contract from the Public Service Co. of New Jersey, involving approximately \$1,000,000, to furnish and install eighteen 15,000-kva., 137,000-volt, power transformers and two large surface condensers in a new steam generating plant to be constructed at Kearney, N. J., during the coming year. Delivery will cover a period of five months beginning about Feb. 1, 1924.

The city of Milwaukee has accepted the bid of the Link Belt Co., Chicago, to furnish and install the complete coal and ash handling system required for the new Riverside pumping station, municipal water works plant, at \$44,800.

The Milwaukee Gas Light Co., 182 Wisconsin Street, Milwaukee, expects to let contracts this week for the construction of a new gas holder, 140 ft. high, at Twenty-fifth Street and St. Paul Avenue, estimated to cost \$1,000,000. R. B. Brown, vice-president and general manager, left for New York Aug. 18 to attend to final details of placing contracts for the complete work.

J. J. Schmidt, Prairie du Sac, Wis., is starting work on the erection of a public garage, sales and service building, 50 x 95 ft., two stories and basement, estimated to cost \$22,000 with equipment.

The Chicago Iron & Metal Co., Chicago, has acquired the entire equipment and machinery of two large sawmills, planing mill, machine and locomotive maintenance shop and other buildings of the J. S. Stearns Lumber Co., Odanah, Wis., which has completed its timber cut and is retiring from business.

The Milwaukee Board of School Directors, Tenth and Prairie Streets, is taking bids until Aug. 30 for furnishing all material and installing complete water purification systems in the swimming pools of the Washington High School, Sherman Boulevard and Wright Street, and the Bay View High School, Montana and Lenox Streets. Frank M. Harbach is secretary and business manager.

The village of Ellsworth, Wis., accepted the bid of the Pittsburgh-Des Moines Steel Co., Des Moines, Iowa, for installing a new steel tank and rebuilding the present steel tower of the reservoir of the municipal water works system at \$5,488.

William Hyink & Sons Co., 727 North Water Street, Milwaukee, manufacturer of special machinery and conducting a jobbing machine shop, will build a new shop, 60 x 100 ft., at Ogden Avenue and Market Street, and is inquiring for additional miscellaneous equipment. The total investment will be about \$50,000. Lawrence Hyink is works manager.

The Board of Education, Stevens Point, Wis., is about to take figures on equipment for sheet metal working and for printing, the first departments to be installed in a \$150,000 addition to the high school now being completed to provide vocational training facilities. Later courses in machine shop practice, plumbing and steamfitting, brass and aluminum casting and other vocations will be established.

The Prairie du Chien Mfg. Co. has been incorporated with \$20,000 capital at Prairie du Chien, Wis., to take over and develop a business established several years ago on a small scale for the manufacture of a combination electric lamp and talking machine. Additions to shop and equipment will be made at once. The principals are J. H. Frazer, Len Palmer, L. C. Cornelius, W. D. Cowall, H. E. Seipp and W. F. Erni.

The City of Green Bay, Wis., is having plans and estimates prepared by A. E. Kringel, city engineer, for the replacement of the present steam boiler equipment of the municipal water works pumping station with gas engine and electric motor equipment, requiring new pumps and auxiliaries. The work will cost in the neighborhood of \$75,000. Frank Cartier is general superintendent.

The Board of Education, Kenosha, Wis., is preparing to ask bids for the construction of a new high school costing \$1,000,000 and a new junior high and vocational training institute costing \$400,000, designed by John T. Chubb, architect, 109 North Dearborn Street, Chicago. Ella F. Powers is secretary of the board.

The City of Portage, Wis., has approved plans by Pearse, Greeley & Hamilton, consulting engineers, 39 West Adams Street, Chicago, for a complete water purification installation with a daily capacity of 1,500,000 gal., to include a new pumping plant with electrically operated pump. The main work will be started early next spring, but bids on the preliminary work, namely, an intake crib and 360 ft. of submerged pipe line in the Wisconsin River at the foot of Pierce Street, are being taken until Aug. 27 by C. J. Loomis, city clerk.

The Milwaukee Steel Foundry Co., 127 South Water Street, has plans for a one-story brick and steel casting shop addition, 50 x 80 ft., and is inquiring for miscellaneous equipment. Fred A. Weiss is vice-president.

Indiana

PLANS are nearing completion for the erection of a new one-story addition to the plant of the Kokomo Steel & Wire Co., Kokomo, Ind., 90 x 400 ft., to cost about \$75,000. It will replace a structure recently destroyed by fire and will be equipped primarily for wire-drawing and kindred service. Harry Backert is chief engineer.

Manual training equipment will be installed in the new high school to be erected at Portland, Ind., estimated to cost \$125,000, for which plans will be prepared early in the fall. The Board of Education is in charge.

A one-story power house will be erected at the plant of the Thleme Brothers Knitting Co., Fort Wayne, Ind., in connection with other extensions and improvements, to cost about \$75,000.

The Studebaker Corporation, South Bend, Ind., has leased property at Capitol Avenue and North Street, Indianapolis, for the establishment of a new automobile service and repair plant.

Stockholders of the Crawford & McCrimmon Co., Brazil, Ind., manufacturer of mine engines, pumps, etc., are perfecting plans for a reorganization of the company with increased capitalization to provide for expansion.

Manual training equipment will be installed in the new high school to be erected at Twenty-fifth and Poplar Streets, Terre Haute, Ind., estimated to cost \$700,000, for which bids will be asked on a general contract in the near future. Johnson, Miller & Miller, 30 North Fifth Street, are architects.

Robert H. Hassler, Inc., 1535 Naomi Street, Indianapolis, manufacturer of shock absorbers for automobiles, is arranging to devote a large portion of its plant to the production of a new type of friction shock absorber for heavy service. The company has recently completed the erection of a new service and repair building at Meridian and St. Joe Streets. Robert H. Hassler is president.

Electric power equipment, conveying machinery and other mechanical equipment, will be installed in the new one-story and basement plant to be erected at Fifteenth and Senate Streets, Indianapolis, 60 x 90 ft., by the Crown Bottling

Works, care of C. E. Bacon, 605 I. O. O. F. Building, architect.

Manual training equipment will be installed in the proposed high school to be erected at Sellersburg, Ind., estimated to cost \$80,000, for which an architect will soon be selected to prepare plans. The Board of Education is in charge.

The Central South

St. Louis, Aug. 21.

EQUIPMENT for an initial daily capacity of 75 tons of brake shoes and castings will be installed in the proposed new plant of the American Brake Shoe & Foundry Co., 30 Church Street, New York, at North Kansas City, Mo., to consist of several units, with power house, estimated to cost \$350,000, including machinery. Bids will soon be asked.

A manual training department will be installed in the three-story high school to be erected at Sedalia, Mo., estimated to cost \$400,000, for which bids will be asked on a general contract early in September. T. W. Bast, Sedalia, is architect; W. B. Ittner, Board of Education Building, St. Louis, is consulting architect.

The Davis Electric Co., 201 Second Avenue, Dodge City, Kan., is planning for the installation of a power lathe for metal working.

The Oklahoma Gas & Electric Co., Oklahoma City, Okla., has arranged for the purchase of the plant and property of the Southern Oklahoma Power Co., and will make extensions and improvements, including the installation of additional equipment and lines. A note issue of \$2,100,000 is being sold to provide for the acquisition and expansion.

Manual training equipment will be installed in the new three-story high school to be erected at Almena, Kan., estimated to cost \$90,000. Smith & English, Nelson Building, Hutchinson, Kan., are architects.

The Day-Evans Iron Works, Inc., Knoxville, Tenn., is arranging a list of equipment to be installed in its proposed local plant for the manufacture of mine cars, wheels and kindred mechanical products. It will consist of four buildings, comprising foundry, machine shop, forge and blacksmith shop, and carpenter and woodworking shop, estimated to cost \$200,000, with machinery. A. W. Evans, Petros, Tenn., is general manager and engineer.

The Allen-Combs Motor Co., Dodge City, Kan., is planning for the installation of a drill press and other equipment.

The Duncan Machinery Co., P. O. Box 265, Knoxville, Tenn., machinery dealer, has inquiries out for a number of engine lathes, 24-in. swing, 6, 8, 10 and 12 ft.; also, for a steam feed, 10 x 36 ft., for sawmill carriage, with piston rod, bracket, etc.; and for several tons of spikes, 1/2 or 9/16 in. by 5 1/2 in.

The Southern Railway Co., Richmond, Va., is perfecting plans for the construction of new shops and freight yards at Caswell, near Knoxville, Tenn., to cost in excess of \$2,000,000, with equipment. A power house is planned.

A machine shop will be installed in the three-story and basement service building, 75 x 120 ft., to be erected at Sixth and Seminole Streets, Okmulgee, Okla., by the X. R. Gill Motor Co., same location, estimated to cost \$115,000. Smith & Senter, 401 Commercial Investment Building, are architects. W. R. Merston is secretary.

The North American Edison Co., operating the Union Electric Light & Power Co., St. Louis, is disposing of a bond issue of \$8,000,000, a portion of the proceeds to be used for extensions and improvements in generating plants and system. The company is a subsidiary of the North American Co., 60 Broadway, New York. Edwin Gruhl is president.

The Common Council, Thayer, Mo., has tentative plans for the installation of deep-well electrically operated pumping machinery in connection with waterworks extensions and improvements, estimated to cost \$40,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, manufacturer of sanitary enameled iron products, will commence the erection of the superstructure for a one-story addition to its foundry on Shipp Street, Louisville, 100 x 150 ft., estimated to cost \$100,000, with equipment. D. X. Murphy & Brothers, Louisville Trust Building, are architects.

The Security Metal Products Co., 2416 East Eighteenth Street, Kansas City, Mo., will commence the erection of a new two-story and basement plant, 41 x 305 ft., at 2800 East Thirteenth Street, for which a general contract has been let to John Gosling, 242 Railway Exchange Building. Sunderland & Besecke, Interstate Building, are architects.

Barker Brothers, 619 Third Street, Dodge City, Kan., operating a general cabinet works, are planning for the installation of additional equipment, including a lathe and belt sander.

A power house and machine shop will be constructed at the proposed new textile mill to be erected at Pine Bluff, Ark., estimated to cost \$900,000. A company is being formed to build and operate the plant. J. E. Boyce, Chamber of Commerce, is in charge.

Manual training equipment will be installed in the two-story wing to be erected at the East Side junior high school at Chattanooga, Tenn., to cost about \$175,000. The Board of Education, Fred F. Frazier, president, is in charge.

A one-story machine shop will be installed in the new automobile service building, 100 x 140 ft., to be erected at 227 West Washington Street, Oklahoma City, Okla., by Frederick Jones, 220 West Reno Street, to cost about \$40,000. G. A. Nichols, Inc., 115 North Harvey Street, is architect.

Electric power machinery, conveying equipment and other mechanical equipment will be installed in the proposed plant to be erected by the Plough Chemical Co., Memphis, Tenn., estimated to cost \$500,000, with equipment. Abraham Plough is president.

The Common Council, Scammon, Kan., is planning for the installation of electrically operated equipment at the local water plant to replace present steam-driven apparatus. M. Snowden is general superintendent.

Kennedy Brothers, Dodge City, Kan., operating a machine shop, are planning for the installation of a drill press and other equipment.

Bonds have been voted at a special election at Lawrenceburg, Tenn., for \$80,000 for the construction of a municipal electric power plant at Shoal Creek, Freeland. Roberts & Co., Independent Life Building, are consulting engineers in charge.

The Pacific Coast

SAN FRANCISCO, Aug. 18.

TENTATIVE plans are under way for the erection of a new plant by the California Tube & Tire Co., Baker-Detwiler Building, Los Angeles, recently organized with a capital of \$1,500,000. The first unit will be used for the manufacture of tubes, with capacity of 1000 per day, and the second unit equipped for the production of tires. A power house will also be built. The plant will cost about \$450,000. The new company is affiliated with the Chillicothe Tire & Rubber Co., Chillicothe, Ohio, and S. S. Wortley, vice-president of the last noted company, will be an official of the new organization. Melville Dozier, Jr., will be president.

The Truscon Steel Co., 709 Mission Street, San Francisco, manufacturer of standardized steel buildings, with headquarters at Youngstown, Ohio, is planning for the construction of a new plant at Pittsburg, Cal., for a Pacific Coast works.

E. E. Joslin, 262 South Wilton Place, Los Angeles, has plans for the construction of a one-story machine shop, 40 x 122 ft., at 1001 Slauson Avenue.

The Southern Sierras Power Co., Riverside, Cal., will commence the construction of a new hydroelectric power plant on Mill Creek, San Bernardino Mountains, to cost about \$5,000,000, including steel tower transmission system.

The Star Drilling Machine Co., Portland, Ore., has awarded a contract to Camp & DuPuy, 424 East Alder Street, for the erection of a new two-story plant at 541 East Fourteenth Street.

The Hammond Lumber Co., Astoria, Ore., has preliminary plans for the construction of a new local plant, with power house, to cost in excess of \$400,000. The structure will replace a mill destroyed by fire a number of months ago. All machinery will be electrically operated.

A machine shop will be constructed in connection with the new automobile service building to be located at 284 South Twenty-first Street, Oakland, Cal., estimated to cost \$65,000, to be built by W. E. Travis, 366 Fourteenth Street, Oakland. J. R. Miller, Lick Building, San Francisco, is architect.

The Perfo Piston Ring Co., Los Angeles, will take bids for the erection of a one-story works, 50 x 90 ft., on West Twelfth Street, for which plans have been prepared by Stromwell-Halperin, Inc., 300 Ferguson Building, architect.

The Hammer-Bray Co., Oakland, Cal., manufacturer of stoves, ranges, etc., is planning for extensions and improvements in its plant in the Fruitvale industrial section, to include the installation of additional equipment.

The Southern Pacific Railroad Co., Arcade Station, Los Angeles, has filed plans for the erection of a one-story machine and mechanical shop at its repair plant on Alhambra Avenue, 85 x 498 ft., estimated to cost \$390,000, with equipment.

The Portland Mfg. Co., Portland, Ore., has plans for the construction of a one-story power house at its plant, foot of Erie Street.

The S. T. Johnson Co., Oakland, Cal., manufacturer of oil burners and oil-burning equipment, is arranging for the removal of its plant to a new building at Arlington and Lowell Streets, and will expand the works at this location for increased output.

The California Metal Enameling Co. has engaged Hamm & Grant, Inc., industrial engineers, 607 Ferguson Building, Los Angeles, to design and construct additions to its plant on East Fifty-first Street, Vernon. One building will be 60 x 75 ft., of structural steel with sawtooth roof, and the other a wood frame truss roof structure, 50 x 120 ft. Erection will be completed early in September.

Canada

TORONTO, ONT., Aug. 18.

INQUIRY for machinery and machine tools continues fair and dealers are of the opinion that an active demand will prevail throughout the remainder of the year. In the Machinery Hall of the Canadian National Exhibition, Toronto, Ont., which will open on Aug. 25, machinery and tool manufacturers from Canada and the United States are preparing for operating demonstrations of their lines. Exhibition officials say that the entire space available has been reserved and that installations of equipment for the opening of the exhibition are proceeding rapidly.

The Ottawa River Power Co., Ltd., 145 St. James Street, Montreal, Que., is in the market for transmission and power machinery to be used in connection with a proposed 60,000 hp. power scheme.

The Lion Mead Rubber Co., Hull, Que., has completed the erection of its new plant there and will install machinery. It is expected that the plant will be ready for operation about Oct. 1.

The Wood Steamers, Ltd., 754 Broadview Avenue, Toronto, Ont., is contemplating the erection of a plant in Scarboro Township for the production of steam motor cars, for which equipment will be required.

The Canadian Westinghouse Co., Hamilton, Ont., will erect a new foundry building on Aberdeen West, to be one story, 205 x 550 ft., steel frame reinforced concrete construction. Bids are being received by B. H. Prack, architect, Main Street East, Hamilton, Ont., and 50 Bay Street, Toronto.

The Canadian Pacific Railroad is asking for bids on a marine terminal building to be erected on Belleville Street, Victoria, B. C., at a cost of \$200,000.

The Berliner Gramophone Co., Montreal, Que., has awarded contract to E. B. Evans, 74 Easton Avenue, Montreal West, for erection of a factory.

The Hydro-Electric Power Commission is carrying on negotiations for the purchase of the plant of the insolvent Georgian Bay Power & Milling Co., Meaford, Ont., to which extensive alterations will be made, including the installation of additional equipment.

The Town Council of Bagotville, Que., has awarded contract for hydro-power plant equipment to Albert Forton, general contractor, at \$125,000. Engineer J. F. Grenon, Chicoutimi, Que.

The Ottawa & Hull Power Co., Ltd., Hull, Que., has been incorporated with a capital stock of \$1,625,000 by Edgar R. Parkins, Howard S. Dunn, Reginald H. Dean and others of Montreal as provisional directors. The Ottawa & Hull Power Co., now producing 40,000 hp. electric energy at Chaudiere Falls, between Ottawa and Hull, will have a production of 100,000 hp. when the plans of the company are carried to completion. A new development will be undertaken at Calumet, about 50 miles up the river from Ottawa.

The plant of Ledoux Jennings Carriage Co., Osborne and Mountain Streets, Montreal, Que., was totally destroyed by fire Aug. 12, with a loss to building and equipment amounting to \$500,000.

An agreement has been reached between the city of Fort William, Ont., and the Great Lakes Pulp & Paper Co., whereby the latter will undertake the erection of a plant within the city to cost not less than \$3,000,000 one unit of which, the pulp mill, will cost \$800,000, shall be completed and in operation within one year, and the paper mill to cost \$2,200,000 is to be completed and in operation within two years. The plant will have a capacity of 100 tons of newsprint daily and not less than 600 men will be employed for 250 working days each year.

The City Council, Ottawa, Ont., is in the market for the following equipment: 1 truck and hoist, 1 continental axle stand, tools for garage, power hammer, cement gun.

The Gulf States

BIRMINGHAM, ALA., Aug. 20.

GROUND will soon be broken for the erection of a new plant at Monroe, La., for the Owen Bottle Mfg. Co., Toledo, Ohio, consisting of a number of units with power house and machine shop, estimated to cost \$1,000,000, with machinery.

A. H. Johnes and associates, New Orleans, La., are formulating plans for the organization of an electric light and power company, capitalized at \$5,000,000, to construct and operate a generating plant in the lower section of the city, estimated to cost \$1,000,000, with equipment. The new company also proposes to develop the plant and property of the Citizens Light & Power Co., with which it will be affiliated, and will enlarge the local power plant of the company, installing additional machinery.

The Dallas Power & Light Co., Dallas, Tex., has plans for the construction of a new power house at North Dallas, and will soon break ground.

Manual training equipment will be installed in the new two-story high school to be erected at Smithville, Tex., estimated to cost \$80,000. H. F. Kuehne, Austin, Tex., is architect.

The Mountain State Pipe Line Co., Amarillo, Tex., recently organized with a capital of \$35,000,000, has tentative plans for the erection of a new oil refinery on local site, primarily for gasoline production, to cost about \$1,000,000. The company also purposes to construct a 28-mile pipe line to oilfields in this section, with pumping plants. It is affiliated with the Producers' & Refiners' Corporation, California Building, Denver, Col. Charles E. Sutton is general manager.

The Common Council, Talladega, Ala., is planning for the installation of electrically operated centrifugal pumping machinery at the municipal waterworks, in connection with extensions and improvements.

A machine shop will be installed in the new automobile service building to be erected on First Street, Miami, Fla., by W. M. Burdine's Sons Co., Miami, to be two-story, 100 x 120 ft., estimated to cost \$50,000. Henry La Pointe, Miami, is architect.

Manual training equipment will be installed in the new two-story high school to be erected at Brookhaven, Miss., estimated to cost \$125,000, for which bids have been asked on a general contract. Emmett J. Hull, Daniel Building, Jackson, Miss., is architect.

The Board of Public Works, Austin, Tex., is planning for the installation of electrically operated pumping machinery in connection with extensions and improvements in the municipal waterworks, for increased supply from the Barton Springs section, estimated to cost \$450,000.

Manual training equipment will be installed in the new junior high school to be erected on South Wesley Street, Greenville, Fla., estimated to cost \$100,000. Linsey & Kilmer, Greenville, are architects.

A lathe, drill press and other machine equipment will be installed in the machine shop to be erected by Hulsey & Holtsinger, Tampa, Fla., to be two-story, 100 x 150 ft., estimated to cost \$50,000. R. B. Gambier, Tampa, is architect.

The Luverne Oil Mill Co., Luverne, Ala., has inquiries out for an oil-operated engine, 50 to 75 hp., with auxiliary equipment. F. M. Douglas is president.

Manual training equipment will be installed in the new high school to be erected at Aberdeen, Miss., estimated to cost \$125,000, for which ground will be broken at an early date. R. A. Heavner, Jackson, Miss., is architect.

The Common Council, Fort Pierce, Fla., is perfecting plans for the installation of additional equipment in the steam-operated electric municipal power plant.

Industrial Items

The Century Steel Co., Poughkeepsie, N. Y., manufacturer of crucible tool and high speed steel, will be liquidated by the Industrial Plants Corporation, 25 Church Street, New York. Equipment to be sold includes complete machine shop with lathes, planers, tools, shapers, grinders, saws, alligator shears, steel jib cranes, gas producer, 20 annealing and tempering furnaces, 50 crucible furnaces and 8 steam hammers, ranging from 600 to 3500 lb. About 400 tons of high carbon steel billets and tool steel will also be sold. These items will be offered at public auction in the early part of September.

The Anniston Electric Steel Corporation, Anniston, Ala., has discontinued its forge and machine shops and in the future will concentrate on foundry business. This was found advisable owing to the large expansion in the two cast steel and gray iron foundries. The company's machine and forging shops are being offered for rent.

Plans of New Companies

A radiator foundry, employing for initial operation about 250 persons, will be constructed immediately by the Miller Engineering Co., Norfolk, Va., on a site near the municipal terminal project, at a cost of approximately \$250,000. The property, consisting of about five acres, was purchased from the Norfolk City Council. The company is financed by Baltimore and Norfolk interests but names have not yet been disclosed.

The McArthur Turnbuckle Corporation, Salamanca, N. Y., with capital of \$35,000, will begin the manufacture of locomotive turnbuckles immediately. Additional equipment and machinery will probably be purchased. Address care of A. Edward Krieger, 33 Main Street, Salamanca.

The Economy Combustion Corporation, 82 State Street, Albany, N. Y., has been organized to manufacture a forced draft system of coal combustion. Installations will be made by contracts with heating engineers. The company is in the market for forced draft blowers, also air pipe and blast gate in diameters from 6 to 24 in. Harry C. Hellbronner is secretary-treasurer.

The Acme Cushion Wheel Co., 2 Columbus Circle, New York, recently incorporated with capital stock of \$200,000, expects to be in production about Oct. 1, manufacturing steel disk wheels. Drop forged and stamped parts will be let out on contract and assembled in the company's plant. It will need a tire press, lathes and buffers when production begins. D. W. Cornfield heads the company.

The Remington Automotive Corporation, organized with capital stock of \$100,000, will manufacture automotive equipment. A plant will be established in about five months and at that time stamping and screw machines will be installed. In the meantime assembly processes will be done by outside companies, contracts already having been placed. C. A. Mandolini, 17 West Sixtieth Street, New York, is president.

The Brady Fireproof Partitions Corporation, care of E. H. Gale, 200 Broadway, New York, has been incorporated to manufacture fireproofing products. The company holds patents on fireproofing materials which have been approved by the city construction department and it is likely that it will undertake manufacturing at a later date. The incorporators are M. E. Williams and E. O. Meyer.

The Western Illuminating Corporation, New York, has been organized to manufacture electric lighting fixtures and kindred products. Plans for operation will not be taken up for several weeks. M. L. Finkelstein and M. and B. Stecker are the incorporators. Corporate representative is Samuel Mandelbaum, 277 Broadway.

The Brenmore Bronze Corporation, New York, has been organized with capital stock of \$10,000 and will manufacture brass and bronze lighting fixtures. Operations are now under way at the plant located at 117 East 129th Street. L. H. Fischer, 33 Union Square West, is president.

The Midwest Air Filters, Inc., New York, recently organized with capital stock of \$200,000 will distribute filtering equipment, engines and like products, but will not be actively engaged for several months.

The Brandes Products Corporation, organized to manufacture radio headsets for C. Brandes, Inc., 237 Lafayette Street, New York, has started operation in a factory at 196-204 Mt. Pleasant Avenue, Newark, N. J. Frederick Dietrich is president.

The Warner Speed Control Corporation of America, Inc., New York, has been incorporated with capital stock of \$20,000 to manufacture motors, engines and like products. It is yet in the formative stage. The incorporators are W. G. Lovatt, G. and A. Worsnop. H. S. Hechheimer, 1540 Broadway, is corporate representative.

The Helmerair Conditioning Corporation, New York, incorporated with capital stock of \$50,000, will manufacture air-conditioning machinery. Temporary office will be at 149 Broadway, care of W. F. Kimber.

The Master Reproducing Needle Co., 510 South Twenty-first Street, Irvington, N. J., has been incorporated with capital of \$200,000 to manufacture talking machine parts. Special machinery is being built, but the company has not found a permanent location. Carl Luebke is representative.

The Salem Handle Co., Salem, Ind., will manufacture axe, pick, sledge, railroad and mining tool handles. A plant has been leased and equipment purchased for immediate needs. O. P. Lind is president.

The Thomas Plow Co., Brunswick, Me., has been organized to manufacture tractor snow plows and equipment to be used in conjunction with the Fordson tractor. Its requirements include various kinds of iron and bolts. H. S. Thomas heads the company.

The Ohio-Kentucky Fluorspar & Lead Corporation, Inc., has been formed to operate fluorspar properties in Ohio and Kentucky. J. B. Kennedy, 607 Mahoning Bank Building, Youngstown, Ohio, is president.

The American Piano Plate Co., Racine, Wis., has been organized as a subsidiary of the American Skein & Foundry Co., Racine, and will take over the piano plate business of the parent company which has manufactured this line for 12 years. Additions have been made in the plate department and new equipment installed. W. F. Walker is president.

The Watson, Frye Co., 213 Front Street, Bath, Me., has been incorporated with capital stock of \$200,000 to operate a general machine shop and foundry. It will take over plant and equipment of the Watson, Frye Co., Ltd., which went into receiver's hands. The company will manufacture paper mill machinery, grinder parts, cylinder molds, special machinery and castings. Orrin F. Frye is agent.

The National Standard Threadless Coupling Co., Bayonne, N. J., formed with capital of 2000 shares, no par value stock, will manufacture hose couplings. An assembly plant is established at 280 Broadway and operations have begun. Aaron A. Milniker, Union Trust Building, Bayonne, represents the company.

The Master Furnace Co., St. Louis, has been organized to manufacture furnaces and heating equipment. All requirements have been filled. J. C. Wilson, R. E. Gardner and J. F. Gillespie are the incorporators.

The Mountain Accessory Co., Emporium, Pa., has been incorporated to manufacture automobile parts and equipment. Present production provides for assembling parts to be purchased outside. Requirements for the first few months have been filled. Guy S. Felt is treasurer.

The Yale Welding Works, 487 Grand Avenue, New Haven, Conn., has been formed to do electric and oxy-acetylene welding and cutting. Future plans have not been determined. William J. Hayward heads the company.

The Auburn Electric Co., Butler, Ind., has been incorporated to acquire a partnership in the manufacture of electric specialties. The company is now operative. N. Ridden heads the company.

The Neilan Corporation, 602 West Building, Houston, Tex., has been organized to manufacture oil well pumps, pumping machinery and check valves. It is still in the experimental stage but when manufacturing begins it will be done by contract. W. F. Haven is secretary.

Jacob & Co., Inc., Indianapolis, has been incorporated to manufacture metal products and composition specialties. A building has been leased at 635 South Delaware street and work has begun on a limited scale. Paul R. Jordan heads the company.

Trade Changes

The Oilgear Co., Milwaukee, has appointed the E. A. Kinsey Co., 235 South Meridian Street, Indianapolis, as selling agent for Oilgear products—broaching machines, hydraulic presses, variable delivery pumps and variable speed drives—in the states of Indiana, Kentucky and Tennessee.

On or about Sept. 1, the Taylor Machinery Co., 78 Battery-march Street, Boston, engaged in the machine tool business, will remove to 261 Franklin Street, that city.

All changes necessary in the moving of business and employees of the Standard Steel & Bearing Co., Inc., from Philadelphia to Plainville, Conn., have been completed. W. H. Hill, purchasing agent; L. Spangler, assistant purchasing agent; L. A. Cummings, consulting engineer; A. W. Fawley, metallurgist; E. C. Whener, specialist; K. A. Johnson, sales manager, and Bernard Shallow, assistant sales manager, are now located at Plainville.

Purchase of the Penn iron property at Lancaster, Pa., by Andrew B. Rote, president A. B. Rote Architectural Iron Works, has been announced. The property includes about seven acres and was successively the site of the Penn Iron & Steel Mill and the Norris Locomotive Works.

After Oct. 1, the Philadelphia office of Power Specialty Co., manufacturer of Foster superheaters, economizers and oil heaters, will be located in the Atlantic Building, Broad and Spruce Streets, Philadelphia.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of excavators, cranes and machine tools, has appointed the Laughlin Barney Machinery Co., Pittsburgh, as representative in Western Pennsylvania and Eastern Ohio, to handle P&H horizontal boring, drilling and milling machines.

The Austin Co. of California has moved into new quarters at 733-37 A. G. Bartlett Building, Los Angeles, Cal.

Uehling Instrument Co., Paterson, N. J. has appointed the Connor-Hudson Co., Southwestern Life Bldg., Dallas, Texas; Gibbens & Gordon, Inc., 532 Canal Street, New Orleans, La. and the Cornell Mathews Co., Orlando, Fla., representatives.

NEW TRADE PUBLICATIONS

Power Pumps and Water Systems.—F. E. Myers & Bro. Co., Ashland, Ohio. Catalog No. P. P. 56. Describes and illustrates self-oiling bulldozer power pumps of 500 to 9000 gal. per hr. capacity; also pumps for mine use and for handling crude oil, kerosene or gasoline. A section is devoted to self-oiling bulldozer working heads for deep wells and a variety of pump jacks. Cylinders and working barrels for hand or power use are shown and a section is devoted to hydro-pneumatic pumps and cylinders for hand or power water supply systems. Spray outfits and accessories are included. A number of pages are given to engineering data regarding pumps and their operation. The size is 6 x 9, 192 pages, indexed. Illustrations are numerous and include sectional views.

Farm Operating Equipment.—F. E. Myers & Bro. Co., Ashland, Ohio. In a booklet of 180 pages, 3 1/4 x 6 in., under the title of "Talking Points About the Myers Line," the features of the company's wide line of pumps, working heads, spray outfits, hay and grain unloading tools and door hangers are described and illustrated.

Steel as Applied to Structural Work.—Dayton Structural Steel Co., Dayton, Ohio. In an 8-page pamphlet illustrations and descriptions are given of the use of steel, not only in large buildings and other structures, but in the formation of racks, both stationary and portable, and in the shape of steel lumber for carrying the light floor loads of residential and similar buildings. Drawings are given showing how the materials may be used, and illustrations of structural work under way, using the materials mentioned.

Twist Drills, Reamers and Other Tools.—Clark Equipment Co., Buchanan, Mich. Catalog No. 18, 5 x 7 1/4 in., 127 pages. Supersedes previous issues. Illustrates and gives list prices and dimensions of a wide variety of Celfor high-speed twist drills, also oil tube, axle centering, ratchet, three and four fluted drills, flat twist, bonding, track bit, flat and flue sheet drills and counter-sinks. A section is devoted to various types of reamers, including also, end mills, spiral end mills and end mills with center cut. A miscellaneous section includes drill chucks and sockets, lathe tool holders, tool bits, and other items. Tables of feeds and speeds, tap sizes, Morse taper shanks and other useful information is included.

Thread Generator.—Fellows Gear Shaper Co., Springfield, Vt. Booklet of 24 pages describing the company's thread generator, the features of which were outlined in THE IRON AGE of June 21. The equipment represents a new application of the gear shaper cutter, a rapid production machine for accurately generating thread shapes such as those used on taps and worms. The booklet is well arranged and liberally illustrated.

Hose Clamps.—Newark Stamping & Foundry Co., Newark, Ohio. Price list No. 15. Includes sizes available and prices of clamps for water, steam, air, railroad and other hose. Construction features are briefly outlined.

Blow-Off Valves.—Perolin Co. of America, 122 South Michigan Avenue, Chicago. Booklet describes and illustrates the construction and operation of the company's "double-service" blow-off valve. Few parts, long service, freedom from jamming, automatic regrinding and adjusting of disk to its seat, proper timing of opening and closing and straightway passageway through the valve are among the features emphasized.

A new organization, known as the Wright Machine Co., has taken over the former plant of the R. B. Phillips Mfg. Co., Grand Street Court, Worcester, Mass. It proposed to manufacture screw machine products. The company will be incorporated within the near future with George M. Wright president, and George B. Cunningham, treasurer. These gentlemen and George F. Wright, George F. Wright Steel & Wire Co., and A. R. Lemieux will constitute the board of directors. Mr. Lemieux is general manager of the new concern.

The Ware Foundry Co., Pine Street, Ware, Mass., resumed operations last week. Most of the plant was destroyed by fire June 7. The capacity of the foundry has been slightly increased. F. J. Quinn is owner.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-Ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price.....	3.54c.
Swedish charcoal iron bars, base.....	7.50c.
Soft steel bars, base price.....	3.54c.
Hoops, base price.....	5.19c.
Bands, base price.....	4.39c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base.....	3.64c.
Channels, angles and tees under 3 in. x ¼ in. base.....	3.54c.

Merchant Steel

	Per Lb.
Tire, 1½ x 1½ in. and larger.....	3.60c.
(Smooth finish, 1 to 2½ x ¼ in. and larger).....	4.10c.
Toe-calk, ½ x ¾ in. and larger.....	4.60c.
Cold-rolled strip, soft and quarter hard.....	7.50c. to 8.50c.
Open-hearth, spring-steel.....	5.00c. to 7.50c.
Shafting and Screw Stock:	
Rounds.....	4.65c.
Squares, flats and hex.....	5.15c.
Standard tool steel, base price.....	15.00c.
Extra tool steel.....	18.00c.
Special tool steel.....	23.00c.
High speed steel, 18 per cent tungsten.....	75c. to 80c.

Tank Plates—Steel

¾ in. and heavier.....	3.64c.
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Sheets

	Per Lb.
Blue Annealed	
No. 10.....	4.59c.
No. 12.....	4.64c.
No. 14.....	4.69c.
No. 16.....	4.79c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20.....	4.45c. to 4.80c.	.....
Nos. 22 and 24.....	4.50c. to 4.85c.	5.10c.
No. 26.....	4.55c. to 4.90c.	5.15c.
No. 28.....	4.65c. to 5.00c.	5.25c.
No. 30.....	4.85c. to 5.20c.	.....
No. 28 and lighter, 36 in. wide, 20c. higher.		

Galvanized

	Per Lb.
No. 14.....	4.75c. to 5.10c.
No. 16.....	4.90c. to 5.25c.
Nos. 18 and 20.....	5.05c. to 5.40c.
Nos. 22 and 24.....	5.20c. to 5.45c.
No. 26.....	5.35c. to 5.70c.
No. 27.....	5.50c. to 5.85c.
No. 28.....	5.65c. to 6.00c.
No. 30.....	6.10c. to 6.50c.
No. 28 and lighter, 26 in. wide, 20c. higher	

Welded Pipe

Standard Steel		Wrought Iron	
Black	Galv.	Black	Galv.
½ in. Butt... —41	—24	½ in. Butt... —4	+19
¾ in. Butt... —46	—32	¾ in. Butt... —11	+9
1-3 in. Butt... —48	—34	1-1½ in. Butt... —14	+6
2½-6 in. Lap. —44	—30	2 in. Lap.... —5	+14
¾ in. Lap... —41	—11	2½-6 in. Lap. —9	+9
9-12 in. Lap. —34	—6	7-12 in. Lap.. —3	+16

Steel Wire

	Per Lb.
BASE PRICE* ON NO. 9 GAGE AND COARSER	
Bright basic.....	5.00c.
Annealed soft.....	5.00c.
Galvanized annealed.....	5.65c.
Coppered basic.....	5.65c.
Tinned soft Bessemer.....	6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet.....	19 c. to 20 c.
High brass wire.....	19½ c. to 20½ c.
Brass rods.....	17½ c. to 18½ c.
Brass tube, brazed.....	27 c. to 28 c.
Brass tube, seamless.....	24½ c. to 25½ c.
Copper tube, seamless.....	26c. to 27 c.

Copper Sheets

Sheet copper, hot rolled, 22½ c. to 23½ c. per lb. base.	
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.	

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Coke—14 x 20	Prime	Seconds
			80 lb..	\$6.55	\$6.30
			90 lb..	6.65	6.40
			100 lb..	6.75	6.50
IC..	\$11.75	\$10.50	IC..	7.00	6.75
IX..	13.00	11.75	IX..	8.25	8.00
IXX..	14.75	13.00	IXX..	9.50	9.25
IXXX..	16.50	14.75	IXXX..	10.75	10.50
IXXXX..	18.50	16.50	IXXXX..	12.00	10.75

Terne Plates

	8 lb. coating, 14 x 20
100 lb.	\$7.00 to \$8.00
IC.....	7.25 to 8.25
IX.....	8.25 to 8.75
Fire door stock.....	9.00 to 10.00

Tin

Straights pig.....	41c.
Bar.....	48c. to 53c.

Copper

Lake ingot.....	17c.
Electrolytic.....	16½ c.
Casting.....	16¼ c.

Spelter and Sheet Zinc

Western spelter.....	7½ c.
Sheet zinc, No. 9 base, casks.....	10½ c. open 11c.

Lead and Solder*

American pig lead.....	8c. to 8½ c.
Bar lead.....	11c. to 12c.
Solder, ½ and ½ guaranteed.....	29c.
No. 1 solder.....	27c.
Refined solder.....	23c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	75c. to 90c.
Commercial grade, per lb.....	35c. to 50c.
Grade D, per lb.....	25c. to 35c.

Antimony

Asiatic.....	9c. to 9½ c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.....	32c. to 33c.
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Old Metals

The market is discouraged and uncertain and business is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible.....	12.00
Copper, heavy wire.....	11.25
Copper, light bottoms.....	9.50
Brass, heavy.....	6.25
Brass, light.....	5.00
Heavy machine composition.....	8.75
No. 1 yellow brass turnings.....	6.25
No. 1 red brass or composition turnings.....	8.00
Lead, heavy.....	5.25
Lead, tea.....	4.00
Zinc.....	3.75

